Pit Quarry

HANDLING ▪ CRUSHING ▪ SCREENING ▪ WASHING

III; 8

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We sent the boys over
—now let's bring them back

BUY VICTORY BONDS!

They won our victory
—now let's pay for it

BUY VICTORY BONDS!

MAY, 1919

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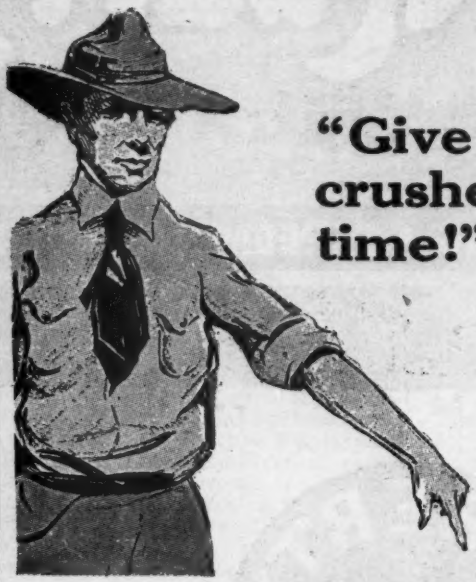
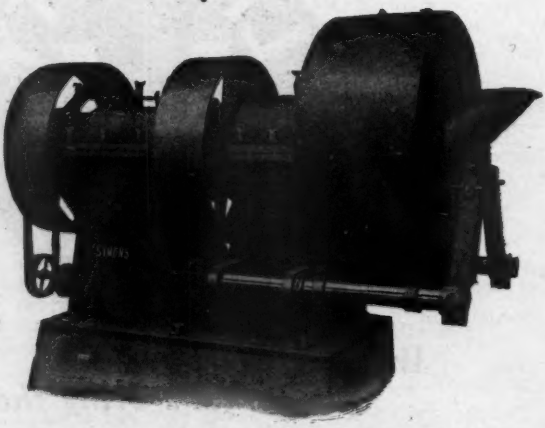


"Give me this crusher every time!"

The Symons Disc Crusher



Users of Symons Disc Crushers are enthusiastic in its Praise, *Here's Why!*

It is the only crusher that will take the rejection, screened or unscreened, from large standard gyratory crushers and effect a reduction to ¾ inch or less, rapidly and at one operation.

It spreads the rock while crushing, thereby avoiding congestion, choking, and unnecessary wear. It is equipped with manganese steel crushing members.

It sustains the main crushing load on a large ball and socket bearing having little movement.

It employs centrifugal force to feed through the material and fling out the product, which it does the instant it is reduced to proper size.

It can be quickly adjusted to make any standard size of product down to ⅜-inch, if desired.

It successfully reduces wet or dry gravel boulders mixed with sand to smaller product.

It excels in economy of power, in uniformity of product and in low repair cost.

It is built in four sizes.

Write for descriptive booklet R.

CHALMERS & WILLIAMS

1430 Arnold St. Chicago Heights, Ill.

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Pit and Quarry

Vol. 3 Chicago, Ill., May, 1919 No. 8

Is a Half Loaf Enough?

THE Railroad Administration has granted a scant half loaf in the matter of a reduction of rates on pit and quarry products. That is, it has, in a manner of speaking, reduced the rates 10 cents per ton, in place of taking off the advance of 20 cents, which was put into effect by Order No. 28.

But the director-general has seen fit to so closely hedge about the new rate with exceptions and onerous conditions that it has caused little enthusiasm among producers and its effect will be felt but little in the direction of the much desired stimulation of business.

The new rate ——. But that term is incorrect; it is not a new rate, but merely a temporary reduction of the existing rate, to be in force from May 1 to December 31. Well, the rate, whatever it may be termed, applies, according to the director-general, to pit and quarry materials "when used in road building or road maintenance, and when consigned to and the freight thereon is paid by federal, state, county, parish, township or municipal government."

And then the statement goes on to say:

"These reduced rates may be applied on shipments consigned as outlined above, but in care of a contractor, provided the freight is paid by the government, and provided proper certification is made by the government through its properly accredited representative that the shipments are for the use of, and the reduction in the rate will accrue to the government."

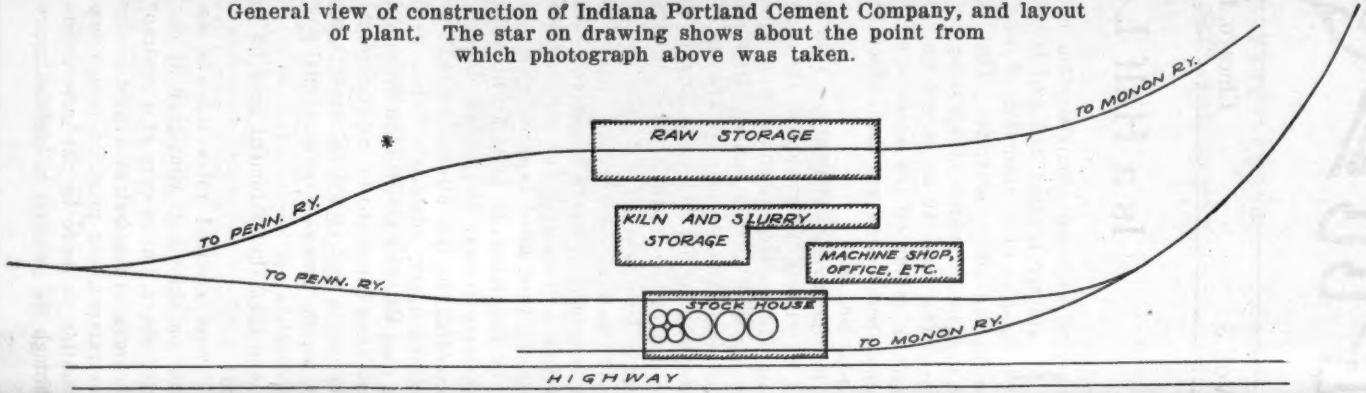
Just as if the wheels of railway commerce were not already sufficiently slowed down by governmental red tape! And this same red tape is one of the most efficient brakes which has ever been devised.

We can see countless delays and misunderstandings which can readily arise under this plan. So can every operator who is producing road building materials. And at least some of them will arise a good many times. There will be misunderstandings, claims for demurrage on cars which have been held pending the settlement of disputes, counter claims, and what not.

Then the system of bidding will have to be revised to fit the new conditions — and that will waste some valuable time.

But setting aside all consideration of working details, two facts remain and stand out so strongly that they cannot be ignored: One is that a 10-cent reduction, even if made universal in application, is not sufficient to bridge over the present crisis; another is, that *any* legitimate piece of construction work, public or private, roads, warehouses, homes, or whatever it may be, will serve to give employment to labor, keep in motion the currents of manufacture and commerce, and add to the stability and prosperity of the nation.

General view of construction of Indiana Portland Cement Company, and layout of plant. The star on drawing shows about the point from which photograph above was taken.



New Cement Mill in Indiana

Compact Plant at Limedale, Built of Reinforced Concrete, Will Begin Operation this Season

A CEMENT plant with a number of unique features is now nearing completion at Limedale, Indiana, and will be ready for operation some time during the present season.

This is the plant of the Indiana Portland Cement Company, of which Adam L. Beck is president, a man who has built up a reputation in the cement producing field within the past several years, particularly in the Oklahoma district. Associated closely with him is his son, Marshal Beck, who is acting as treasurer and purchasing agent and is spending all his time right on the job while the construction is in progress.

Limedale is a small town just south of Greencastle, in which city is for the present located the main office of the company. When the plant is completed, however, the office will be moved to Indianapolis, so as to be in closer touch with the markets which this plant will supply.

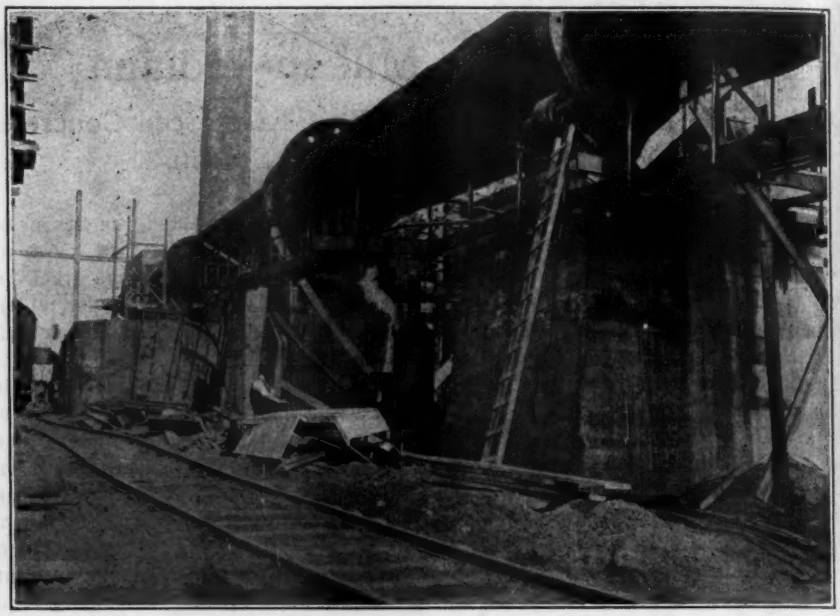
The plant was located at Limedale very largely because of the first-class railroad service which it affords. North and south through the town runs the main line of the Monon Railroad, while in the other direction is the line of the Vandalia branch of the Pennsylvania running from Indianapolis to Terre Haute and beyond. The plant is situated immediately between the two roads and has direct connection with both, as will be seen by reference to the layout drawing. It will be noted, for instance, that the storage bins have tracks on each side, under cover, one connecting with one road and one with the other. For the introduction of raw materials only one track is provided, as it is of course, necessary that all cars of stone come in on the same track in order to dump into the hopper which feeds the crusher. But this track connects with both roads.

The construction of the plant is practically all of reinforced concrete. It will be noted from the illustrations that this concrete work is quite complicated, with little possibility for the reuse of forms from one place to another, so that the form work has been a big item in the construction. But the builders realize that once the plant is constructed it will be there to stay and give efficient service through a long series of years, so that they are willing to spend the money to have it right in the first place.

One of the unique features of the plant is that the storage of all materials, except the finished cement, will be confined to one building. This is merely incidental, however, to the idea of compactness which is being carried out throughout the entire design, which has been made by F. L. Smith & Company, engineers, of New York. In this storage building will be kept the stone, clay, shale, clinker, gypsum and coal.

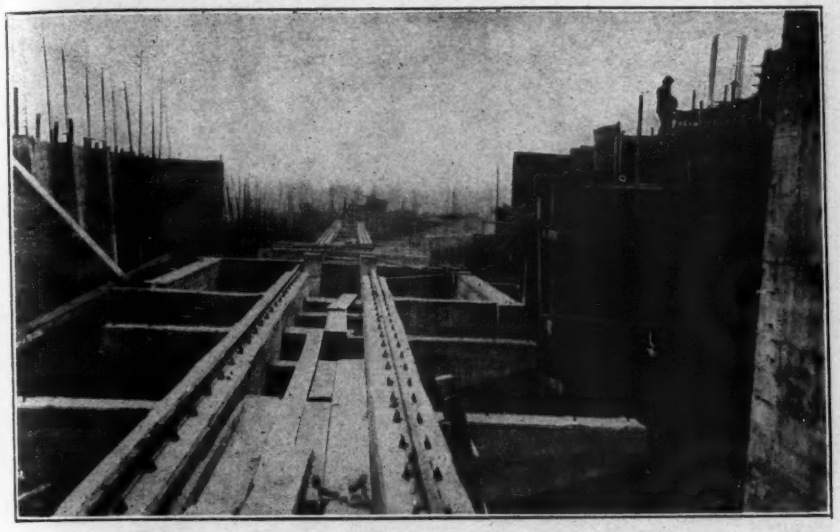
The railroad track as previously noted, runs through this building, under it being a hopper into which the rock is dumped from the cars, being fed from there to the No. 20 McCully crusher.

The company has a quarry of its own close to the plant; but it will get a large part of its limestone rock from some of the dimension stone quarries



Big kiln in place on its concrete supports.

Building slurry tanks and mixing basin.



Track where stone comes in

of the locality, who can thus dispose of their waste to good advantage, at the same time furnishing raw material to the cement plant at the mere cost of transportation.

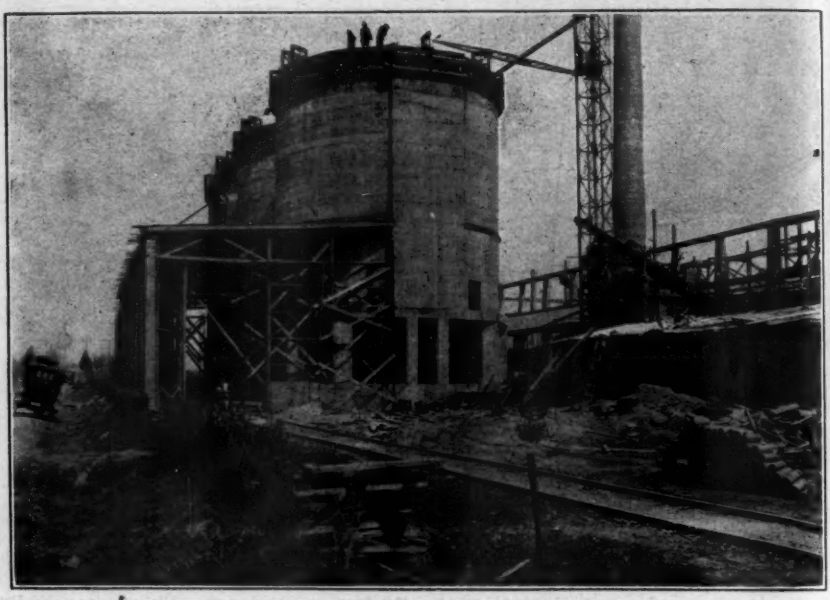
The storage building is completely equipped with elevating and conveying devices, including Jeffrey chain and bucket elevators and Caldwell elevating and conveying outfits. These also extend to the other parts of the plant, so that the materials are mechanically handled from start to finish. The building is equipped with an electric traveling crane, supplied by the Bedford Crane Company, Bedford, Ind., and covering all parts of the building.

In the matter of burning equipment, this company evidently believes it to be a good thing to put all its eggs in one basket, but to be very careful first that the basket is all that it should be and will not fall down at the critical moment. So it is confining its equipment to one kiln, big enough to turn out 1,500 barrels a day; that is, it is 240 feet long and 10 feet in diameter. This unusual kiln was built by the Power and Mining Machinery Company of Milwaukee, and is now being placed on its foundations, as the photographs show. Around it will be constructed the kiln building, which will also contain the grinders, clinker cooler, coal mills, and dryers.

For carrying off the smoke and gases from the kiln is a Weber chimney, 210 feet high and 26 feet in diameter at the base. This chimney is already completed and furnishes a fine example of concrete chimney construction.

The company owns 460 acres of land at this point, which is underlaid with a high calcium lime, as well as supplying the clays necessary for a correct mix.

The plant is designed to operate on the wet process, the equipment including a Smidth clay wash mill, and mixing basin, concrete slurry storage tank, and correcting basin where the mix is corrected to accurate proportions before being pumped to the kiln



Bins for the finished product.

All buildings have frames of reinforced concrete.

by means of the Gould slurry pump.

Two 42-inch Fuller mills are used for grinding the coal, which is then carried to the kiln by means of screw conveyors, after first being dried in a Cummer dryer.

The clinker passes to the cooler as it comes from the kiln, then to the

Site of the storage building.

clinker storage, from which it is carried to the Smidth Kominuter and then to the tube mill for finish grinding.

The storage house for the finished cement is in the form of circular tanks as shown in the illustrations. It is drawn from these direct into Bates' packers, the packers moving on rails the length of the packing house, so that they can be connected almost instantly with any desired storage tank. Two of these outfits will be in use. They run directly under the bins and fill from bottom gates, the bins being on legs for this purpose, so that access may be readily obtained to cars on either track. The two tracks, as previously noted, connect with the two railroads passing through the town.

All machinery is operated by means of Westinghouse motors. The current to supply these is purchased from the interurban electric car line which passes within a short distance of the plant.

Mr. E. B. Beck of Mt. Bethel, Pa., has incorporated Seguire & Co., with a capital of $18,000.

Road Importance.

AS A RULE, producers of road building material do not advocate the exclusive construction of any type of road, but rather advise the selection of a type of construction that will serve the traffic to be carried at the lowest annual cost per unit. First cost, maintenance cost, and interest on money invested are the principal items of expense, and it is the adapting of these to local conditions that brings out the wisdom and experience of road builders.

There have been too many extremes. In some sections, roads excessive in first cost have been built on the assumption that the maintenance cost would be nil, and, therefore, no money was provided for upkeep. In other localities there has been a tendency to construct as many miles as possible with the funds available, so that the quality of the roads is not in keeping with the traffic that they would have to support.

These are unwise conditions, just as much so as the assumption that a standard type should be laid down to give economical results under all conditions.

General Method of Developing and Working Quarries

Describing Three Types of Quarries and Telling Particularly of Developing and Operating Pit Quarries, Showing How Money Is Saved by Modern Methods

By Daniel J. Hauer

THE subject of developing a quarry would seem to be one that most quarry men would only have to consider a few times during their lives. That is, only when opening up a new quarry; but this is not strictly the case, for although the only stages of developing come when a quarry is first started, yet inasmuch as the working of a quarry depends upon the manner in which it is developed, and this development must be considered from time to time so as to keep down the operating costs, and new places must be opened in a quarry from season to season, the methods of development are always being brought up for attention. In reality, development and operation go hand in hand.

In developing or opening a new quarry the methods to be used must be governed by many factors, but for the purpose of easy consideration it is possible to divide all quarries into three classes. Namely:

Quarries in pits
Quarries on grade
Quarries above grade

Those in pits are below the ordinary surface of the ground, the plant being above the level of the quarry floor. Those quarries on grade have the plant on the level of the quarry floor. Those above grade have the floor above the elevation of the plant. Thus we have three types; yet all these may occur in the same quarry working, as is the case in one quarry with which the writer is familiar located in the eastern part of New York state. This quarry has been worked for nearly a hundred years, and has at least six developments, three or four being on different elevations. In operating, each development or level is termed a quarry and spoken of as Quarry No. 1, Quarry No. 2, etc. The original working was in a pit, then higher levels were opened up. Finally a new plant was built in the side of the mountain and developments higher up made.

Yet it can be seen that although one set of workings may have two or more types of development, yet each type has distinctive features that must govern the type of quarry plant installed and the methods of operations, likewise the procedure that must be followed in first opening up the quarry.

Quarries In Pits

The rock of this type of quarries generally lies in heavy ledges below the ordinary surface of the ground. This means that an overburden of earth and possibly decomposed rock may cover the ledge, there being some outcroppings of the ledge on the surface.

The first thing to do is to bare a section of the ledge by stripping off this overburden. The plant to handle the product is generally located within easy reach of the first opening.

With a section of the ledge exposed, it becomes necessary to attack the ledge from on top, the most expensive method of excavating rock. For this reason, the first work is not carried on as in sinking a shaft, but instead only started in that manner.

As soon as a depth of even 10 or 15 feet into the ledge is obtained, the exposed breasts are worked. Thus as the expensive work of sinking by drilling, blasting, or gadding, is done, the less expensive work of widening the opening should be carried on. Thus should the quarry be taken to a depth of 100 feet or more below the surface, only a limited part is done by sinking, the rest being in working the breasts as they are exposed. This means the distribution of the expensive work over a greater tonnage.

Water is almost certain to accumulate in a pit, hence one of the first things to consider is a pumping plant. For this purpose high lift pumps must be used. These pumps can be operated by air, steam, electricity, or gasoline. The last is used extensively for small pumps, but has not been developed entirely satisfactorily for the higher power and larger pumps with high lifts.

Generally steam is used, due to the fact that a steam plant is installed for other purposes. This is also the case with compressed air, which is frequently used for drilling and channeling, making it possible to use air pumps. Electrical pumps are also used when electrical power is employed for other purposes. A part of the water so pumped should be used for the various purposes for which water is needed around the quarry, thus saving a duplication of expense for pumping. In many cases water is pumped both day and night so that only a limited storage capacity is needed.

For all pit quarries, there must be some method of raising the rock from the quarry floor to the mill or plant. There are five distinct types of plants for this purpose on the market:

1. Derricks,
2. Incline runways or tracks,
3. Cableways,
4. Conveyors,
5. Vehicles.

Each of these methods has some advantages and disadvantages.

1. *Derricks*: For starting a pit development derricks are to be preferred and are nearly always used. Stiff legged derricks can be used, but a

Fig. 1—Showing an incline into a pit quarry.

large guy derrick has so much greater range of work that it generally proves more economical. The opening in the pit is generally made near enough to the mill to allow the derrick to be set up so that the boom when three-quarters lowered will reach over the pit and when half lowered will reach to the plant or mill to deposit the quarried product for use. With two derricks erected, one on each side of the plant, almost continuous operation of feeding the plant can be carried on. With derricks there is no limit to the depth that a quarry can be worked, though naturally the deeper the quarry the slower the operation of hoisting.

As the pit is widened out the derricks will not reach the skips or buckets where they are loaded, so that it becomes necessary to install other derricks on the quarry floor to place the skips under the derrick booms on the surface. Thus there can be a great duplication of derricks and much rehandling. To overcome this, carts are sometimes used to haul the rock to the derrick skips, or else small cars on tracks. In some cases the car bodies are detachable, thus making the body a derrick skip, or the skips are placed on low flat cars and carried from the derricks to the working faces of the quarry. By the use of derricks after the quarry is fairly well developed, there is no method that does not mean that the product, or the container holding it, must be handled twice. To overcome this—

2. *Incline Runways or Tracks* are installed. To do this, sufficient area must be developed to give the incline the proper grade. In Fig. 1 such an incline is shown in a pit quarry. On this, cars can be operated, and these cars run to the breast of the quarry. It will be noticed that this is not being done in the quarry illustrated in the photograph, but instead the product is hauled in carts to the foot of the incline and there dumped into cars. Thus the very purpose of the incline in this case is defeated.

Another objection to the incline shown is the long legs of the bents. This makes the trestle work not only expensive to build, but also to maintain, and gives a greater chance of men being hurt in going upon the trestle. Such a trestle cannot be built until the quarry is excavated to the proposed floor elevation, making the use of derricks at first imperative.

In Fig. 2 a sketch is given showing the proper way to excavate the rock to build and maintain an incline trestle. The rock is taken out in steps so that none of the bents need be over 10 feet in height and most of them much less. In this way a walkway or steps can be placed on one side of the incline for the men. It also becomes possible to make the original excavation without derricks, building the incline as the excavation is made, connecting up the lower end temporarily until a new blast is made and the quarry carried deeper. It can be seen from the sketch that a derrick with a 60-foot boom would not reach to excavate a quarry in this manner to a depth of more than 35 feet. These steps on one side of the pit may also mean a saving in money in running pipes out of the quarry for the pumps and in getting heavy machinery in and out of the pit.

3. *Cableways.* These can be installed over a pit before any excavation is made and used not only for hoisting but also conveying the product to the mill. The disadvantage is that as the excavation is made under the cableways or to develop a large area, one end of the cable must be moved frequently or this end must be built without a dead man so that it is movable at will. Even then only a limited area can be worked unless

derricks or cars are used to serve the cableway.

The three methods already described are those in most common use, but some few pit quarries are equipped with—

4. *Conveyors.* For these there must be an incline to carry the belt conveyor, or elevating buckets. Such conveyors generally run continuously, while the other three machines are run intermittently, as the loads do not come to them with the regularity desired. For this reason some object to conveyors. Another objection is that the material must be hauled from the breast of the quarry to the foot of the conveyor and there rehandled. Nevertheless, conveyors for elevating and carrying many products are gaining in favor and their economy is being demonstrated where a steady flow of material is desired.

5. *Vehicles.* Carts, wagons and trucks are used to carry products from many quarries to the plant or mill, but mostly in quarries of the other two types, yet in some few cases they are used from pits. It means the grading of a circular road up one side of the pit to overcome the steep grade, and even such grades as can be obtained are bound to limit the load that can be hauled. For this reason vehicles in pit quarries cannot be recommended except possibly for stripping.

GENERAL FEATURES OF DEVELOPMENT

In most cases pit quarries are developed in a circular shape, unless the ledge is very narrow, when the pit is oblong. At times the ledge may have some soft or decomposed rock in it, and in such large quantities that it does not pay to take it out, thus puting an angle or angles in the quarry.

In developing pit quarries, it is the rule of most quarrymen to drive the pit to some depth, generally between 50 and 100 feet and then work it in one lift. On the other hand these pits are susceptible of being developed into easy and practical working quarries in as many lifts as it is desired. There are many advantages in this, for it is possible to lay out the quarry development and operation in the best manner possible. Thus the most economical drilling can be done. The holes can be placed in the best manner possible, and thus explosives can be saved. This is all due to the fact that the lifts, all but the top one, will run even and the rock is not likely to vary much in hardness in each lift.

In blasting, the great mass does not fall to the bottom of the quarry, but to each floor level only, saving the raising up of many tons over the

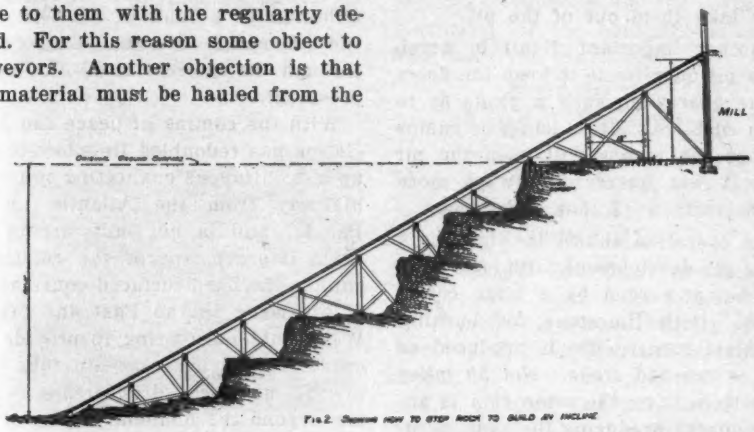


FIG. 2. SHOWING HOW TO STEP ROCK TO BUILD AN INCLINE

greatest height. It thus becomes possible to save from 10 to 30 per cent of the quarry costs in this way. It is not difficult to develop a quarry in this manner except to arrange the car tracks, if cars are used in the quarry, to run to the one or more inclines. The various levels in the pit must be laid out with track arrangement in view. It is necessary in some cases to run cars up an incline from one level to the other and by another incline take them out of the pit.

Another important detail in developing pit quarries is to keep the floors of the quarry on such a grade as to drain each well into a sump or sumps so that the pumps will keep the pit dry. A wet quarry is always more expensive to work than a dry one.

The operation shown in Fig. 1 is a crude pit development, although it is now being worked by a large corporation. Both limestone for burning and blast furnace use is produced as well as crushed stone. Not 50 miles away from it on the same vein is another quarry producing the same products, operated by a smaller corporation, and is worked in lifts as described, three operations going on at one time, and the contrast is remarkable. The last quarry, although it has some defects, gives one much pleasure to visit and see at once how money is being made by using modern methods in quarrying. It is little wonder that this quarry can sell its products to the limit, either in dull or prosperous times.

The Schaffer Engineering & Equipment Company, designers of lime and stone plants and manufacturers of the Schaffer hydrator and the Schaffer poidometer, have moved from Tiffin, Ohio, to Pittsburgh, Pa., where they will be located in the Peoples Bank Building.

Gives $100,000 to Lincoln Highway

General Motors Corporation Makes Possible Elimination of Last Gap on Cross-Country Route

THE Lincoln Highway Association has announced from the Detroit headquarters the contribution of a fund of $100,000 from the General Motors Corporation, through the interest of W. C. Durant, president.

With the coming of peace the Association has redoubled its effort to link up a "continuous connecting improved highway from the Atlantic to the Pacific" and is not only urging the rapid improvement of the remaining gaps in the hard surfaced construction of the route in the East and Middle West, but endeavoring to provide the outside funds necessary to take care of the unimproved stretches which are beyond the financial ability of the states and counties of the far West.

With the completion of the Goodyear section across the Great American Desert in Utah and the Fisher Pass section which opens the connecting link between Salt Lake City and the Desert, there remain only four or five short stretches of unimprovement between the two coasts, which require outside aid. The Desert section and the Fisher Pass construction, financed by the Goodyear Tire & Rubber Company, Mr. F. A. Seiberling, president of the Lincoln Highway Association, and Mr. Carl G. Fisher, vice-president of the Association, to the extent of $125,000, will be completed by July first. The sections in Wyoming and two bad places in Nevada have already been financed by Mr. John N. Willys, through a contribution of $50,000.

Pays to Have Surplus Storage Space

Readiness for Emergencies Characteristic of the Efficient Pit and Quarry Owner

IT costs very little to provide a simple surplus storage arrangement, such as here shown.

And think of the advantage of it when the car supply is uncertain, or

when it is going to be necessary to shut down for repairs.

This photograph was made at the plant of a Kentucky stone operator, and shows a simple concrete pit along the track, with a derrick and clamshell bucket for handling the material.

Imports of Gypsum

Imports of gypsum have not yet returned to normal, according to the Bureau of Mines. Although imports of crude gypsum have been steadily declining both in tonnage and value since 1913, they were still more sharply curtailed during 1918, owing to war conditions and regulations.

In 1916 crude gypsum imports averaged 21,200 tons per month, valued at $1.08 per ton; imports of ground or calcined gypsum amounted to about 1,000 tons per month, valued at $6.18 per ton. In February, 1919, only 18 tons of crude, valued at $4.45 per ton, was imported, and none at all from March 1 to 15.

Of the ground or calcined gypsum 444 tons, valued at about $16.50 per ton, was imported in February, and 267 tons valued at about $14 per ton, from March 1 to 15.

Practically all of the imports are from Canada. In 1918 only about 25 per cent of the usual tonnage of gypsum was mined in Canada owing to stagnation of the building industries and other war conditions.

Model Price List

How an Active Sand and Gravel Company of Detroit Quotes Rates

A PRICE list which in some respects might be taken as a model, is issued monthly by the Superior Sand & Gravel Company, Detroit.

This company has established clearly defined districts for the delivery of sand and gravel, the prices varying in each district. For instance, the April list quotes concrete gravel in district No. 1, $2.45; district No. 2, $2.75; district No. 3, $3.10; district No. 4, $3.40.

The boundaries of the different districts are given in the price lists, so that the purchaser will have no trouble in determining what his rate will be.

Outside of these districts an additional charge is made of 30 cents a yard per mile.

The price list also carries this suggestion to the purchaser: "Deliveries will be made between curb and sidewalk. Please get permit from Department of Public Works, and arrange to protect materials. Goods are sold on the understanding that our responsibility ends with deliveries at curb."

Motor truck garage of Ohio River Sand Company, Louisville, Ky.

Good Place to Keep Motor Trucks

Louisville Concern Has Completely Equipped Fireproof Garage to Care for Them

SUPPOSE you had a fleet of seven 5-ton Pierce-Arrows — or any other make of motor truck, for that matter—where would you keep them?

Not out in the yard back of your office, surely. Even an old-time dump wagon, costing not one-tenth as much as the motor truck, is worthy of better care than that.

You would keep them under cover, of course; but not every concern would provide as well for them as has the Ohio River Sand Company of Louisville, Ky.

This company has a commodious, durable, fireproof garage, right at the docks where the boats bring the sand in from the pumps, and where the office is also located.

The Ohio River Sand Company adopted the motor truck as a means of delivery three or four years ago. That is, it began to adopt it. In other words, it gave it a trial. The result has been the gradual increase of the fleet to the present seven; and if you can see the illustration distinctly you will count ten bays to the garage—indicating that the delivery equipment is perhaps not yet up to the production capacity of the plant.

The building has reinforced concrete frame, with entire concrete floor, and concrete roof pierced with a number of skylights. The curtain walls are of brick, and upward-swinging steel doors are provided at each bay, making the building completely fireproof.

It is fully equipped for all kinds of

The building is fireproof throughout.

machine work ordinarily required on motor trucks, and employs a machinist and helper. The equipment includes a portable outfit for oxy-acetelyne welding.

The forge is in a separate shop, a much older building, as this was in operation to make general repairs for some years before motor haulage was adopted.

Michigan Companies Combined

The Federal Sand & Gravel Company, capitalized at $150,000, has been organized at Saginaw, Mich., to succeed and combine the Huron Shore and Marquette Gravel companies, the Emerson pit of the D. & M. railroad, and act as local representative of the Crescent Gravel company at Hersey, Mich.

The officers are: President, C. W. Luce, East Tawas; vice-president and general manager, John S. Porter; treasurer, S. S. Roby; secretary, Leet Denton; assistant secretary, Miss Olive Owens. The offices of the company are in Saginaw.

Jno. S. Porter, vice president and general manager, is a member of the executive committee of the National Association of Sand and Gravel Producers as well as secretary and treasurer of the Michigan Sand and Gravel Producers Association.

Progress of New Muscatine Company

Delmar G. Asthalter, who recently returned from Camp Pike, Ark., after nine months' service, has assumed the position of manager of the Automatic Gravel Products Company, Muscatine, Iowa, a corporation which is erecting a large gravel plant on Muscatine Island.

The Automatic Gravel Products Company was formed this spring by Davenport capitalists, and has leased a tract of land on Muscatine Island in the heart of the gravel district, just across the road from the plant of the Northern Gravel Company.

Active construction work on the new plant has been started and will be completed as quickly as possible. No date for the completion has been set.

Mr. Asthalter, manager of the new company, was for six years in the estimating department and a traveling salesman for the Roach and Musser Sash and Door Company. He left Muscatine with a draft contingent July 23, going to Camp Pike, Ark., where with the rank of sergeant, he has been in the personnel office.

The company of which Mr. Asthalter has become manager is probably the largest gravel products company in Iowa. A capacity of 75 cars a day is the maximum output of the proposed plant. Enough contracts have already been received to keep the plant operating almost at capacity during the remainder of the summer, as soon as it is finished.

Knocks Off 10 Cents Per Ton

Railroad Administration Cuts Rates on Road-Building Materials for Government Work

WALKER D. HINES, director general of railroads, announced on April 11 that he has decided, after consultation with the Departments of Agriculture, Commerce and Labor, to reduce the present regularly published tariff rates upon specified road-building materials when for use in federal, state, county, parish, township or municipal government road work.

This will authorize all railroads under Federal control to apply rates as shown below on carload shipments of stone (broken, crushed and ground), slag, shells, chatts, cherts, sand and gravel, shipped during the period from May 1 to December 31, 1919, inclusive, when for use in road building or road maintenance, and when consigned to and the freight thereon paid by Federal, state, county, parish, township or municipal government.

The reduced rates to be applied on such material shall be 10 cents per net ton less than the regularly published tariff rates in effect for the transportation of these materials for commercial uses at the time shipments move; but with a minimum charge of 40 cents per net ton, except that where the regularly published commercial rate is less than 40 cents per net ton, then such regularly published rate shall apply.

These reduced rates may be applied on shipments consigned as outlined above, but in care of a contractor, provided the freight is paid by the government, and provided proper certification is made by the government through its properly accredited representative that the shipments are for the use of, and the reduction in the rate will accrue to the government.

The rates authorized are to be applied without publication in tariffs, account government property, but each railroad hauling such material is charged with the duty of seeing that the reduced rates are applied only on bona fide government material where the freight charges saved by the reduction will accrue to the government as indicated above.

Cement Price Reduced in New York

Drop of Fifty-Five Cents Made Early in April in Order to Stimulate Construction

FEDERAL pressure on building material prices in New York resulted early in April in a 55-cent drop in the price of Portland cement in that market.

At the same time price readjustments in other building materials became effective, mainly in the supplemental lists.

The one object of putting the price lower is to bring the market within the reach of the investor, but the change, being an artificial one, is not to be of long duration.

The Gates Sand & Gravel Company of Charleston, W. Va., is now operating under the firm name of the West Virginia Sand & Gravel Company. The capital stock of the company was increased from $25,000 to $100,000. The company is to extend its activities considerably. Six new sand and gravel barges costing approximately $30,000 are now being constructed.

The Wolverine Portland Cement Company resumed operation at its plant at Quincy, Mich., about the middle of April.

Report on Prices of Cement

Duluth Engineering Society Finds Fgures Not Proportionately Greater Than Other Building Materials

SOME weeks ago the Duluth Engineers' Club appointed a committee to report on the reasonableness of the prices for portland cement. The committee reported as follows:

The following are the prices of portland cement net f. o. b. Duluth, from 1913 to 1919:

1913	$1.55
1914	1.50
1915	1.41
1916	1.56
1917	1.91
1918	2.01
1919	2.20

This range of prices shows an increase in 1919 of 56 per cent over 1915 price.

From data obtained from the Universal Portland Cement Co., they contend that the cause of the increase in cost of production in 1918 over 1915 is approximately as follows:

Labor	127%
Fuel	115%
Mill overhead	110%
Packing and loading	167%
General expense	49%
Care of empty sacks	62%

Quoting further from their statement, the increase on certain classes of skilled labor ran as high as 146 per cent.

In comparison with other commodities used in construction work, we find that there have been the following increases:

Gravel	36.40%
Sand	56.25%
Crushed rock	50.00%
Brick	23.10%
Lumber	70.50%
Labor	100.00%
Teams	60.00%

These figures were obtained from records in the engineer's office of the City of Duluth.

In this regard we quote from bulletin of March 4, 1919, issued by the United States Department of Labor Information and Educational Service, as follows:

"At the close of the war the index number of building materials, not including steel, had risen only 61 per cent over the pre-war prices of 1913, while the index number for commodities, exclusive of building materials, have risen 113 per cent. The average increase of wages in the construction industrial in 41 leading cities from 1914 to 1918 was only 28.5 per cent, as against the rise of 94 per cent in commodities."

From the foregoing data it would appear that the increased price of cement has not been proportionately greater than the average increase on other building materials.

St. Paul Cuts Prices

To facilitate and encourage building in St. Paul a slash in the prices of some of the leading and most important of building materials was made by St. Paul dealers, according to Ivan Ringstad, president of the Midway Lime and Cement company.

"A reduction of 50 cents a ton has been made on Portland cement," said Mr. Ringstad. "In a normal year St. Paul uses about 75,000 tons of cement. This reduction in price means a saving in one year to the builders of St. Paul of $40,000 on cement alone."

The price of lime has been reduced between $1 and $2 on each ton; wall plaster, 50 cents per ton; fire brick, $5 on each 1,000 bricks, and bricklayers' cement, 50 cents per ton.

"On its face," Mr. Ringstad said, "the reduction does not seem to amount to much to those not in the building industry. But, if figured in carloads, the reduction on cement means a saving of as high as $25."

This action by dealers in building materials, he said, is expected greatly to encourage post-war building activities in St. Paul.

Six hundrd employees of the Kelley Island Lime & Transport Company went on strike about the middle of April at the quarries near Marblehead, Ohio. They are demanding a 9-hour day with the present 10-hour pay.

The Kirkpatrick Gravel Company, Greenfield, Ind., has been incorporated to procure, sell and deliver gravel, sand, etc. The directors are C. M. Kirkpatrick, A. S. Kirkpatrick and Homer L. Smith.

Big blast at quarry of Bethelhem Mines Corporation.

Pennsylvania Quarry Shoots Big Blast

Details of Operation Which Brought Down 200,000 Tons of Rock at Steelton

THAT is a good deal of rock—200,000 tons; but that is about the estimated amount broken down from the working face in a recent blast at the quarry of the Bethlehem Mines Corporation at Steelton, Pa.

The first work in preparation for the blast consisted of drilling seventy-nine 6-inch diameter blast drill holes averaging 96.8 feet in depth, the shallowest of which was 64 feet and the deepest 120 feet. The holes were drilled by means of three electric traction Clipper blast-hole drilling machines, as manufactured by the Loomis Machine Company, Tiffin, Ohio, and were operated by one man to each machine and a master driller who had entire charge of drilling. It might be mentioned that the Bethlehem Mines Corporation has eleven of these Clipper drills in all.

The drilling time for this blast extended over a period of four months with the average working time per machine of 260 hours per month. A total of 7,648 feet of hole was drilled.

At 2 A. M. on the day of the blast, men at the quarry commenced pumping the holes by means of two Gasoline-driven outfits. At 7 o'clock four two-men gangs commenced loading, and by noon they had sixty-nine of the seventy-nine holes completely finished.

In addition to the above mentioned loading crews there were four men slitting the 5x10-inch cartridges in order to expedite the loading, and also six men tamping the holes with "dust"

taken from the crushing plant. This material is finely graded and consequently "free running," and its experience has led this concern to believe that it is as desirable a material as can be used for "stemming" holes.

The Pennsylvania Trojan Powder Company's products were used, an average of six boxes of 50 per cent powder in the bottom of each hole, and an average of nine boxes of 40 per cent to each hole. Into all the holes of this blast was loaded a total of 23,600 pounds of 50 per cent powder and 35,250 pounds of 40 per cent powder.

No. 6 cotton-countered Cordeau-Bickford detonating fuse was used in each hole, and No. 6 plain for the "lead." Of the first mentioned, 7,700 feet were used, and 1,400 feet of the plain. At 2:30 P. M. the blast was completely loaded and ready to be thrown down, which was considered excellent loading when the number of men employed and the weather conditions were all taken into consideration.

Two rows of holes were drilled, the first of which was 25 feet back from the face of the quarry, and the holes 19 feet apart on centers. The second row was 14 feet behind this and staggered between the holes of the first row.

The Crowley Ridge Gravel Company, Little Rock, Ark., has been incorporated with a capital of $10,000. P. J. Lewelling is president, Lena Price-Williams, vice-president, and Vernon Price-Williams, secretary and treasurer.

The plant of the Humboldt Material & Supply Company at Eureka, Cal., is expected to begin operation very soon. This gravel screening plant is located on Mad River, and the material will be excavated from the river with a dragline excavator.

After the Sand Men

Kansas Will See That Royalties Are Promptly Paid

FRED KNAPP, state auditor of Kansas, is after the sand men.

Perhaps the state executive council was a bit drowsy in the past, and did not notice that the sand men had been a little slow in paying to the state treasurer their royalties for taking sand from navigable streams in Kansas. The statutes of Kansas provide that no person shall take sand, gravel, oil, gas or mineral from any navigable river without obtaining the consent of the executive council of the state, composed of the governor, attorney general, secretary of state, treasurer, auditor and superintendent of public instruction, and making arrangements for paying for such material.

Sand companies are supposed to make a report on the first and fifteenth of each month of sand taken from rivers and the amount sold, and between these dates to pay to the custodian of the executive council 10 per cent of the gross receipts of sales of sand.

Mr. Knapp, who keeps the account of the sand companies, noted that several of them were delinquent in making their payments, and called the attention of the state executive council to the matter. A resolution was passed by the council providing that hereafter when any sand company neglects to make its report for ninety days, its contract with the state shall be canceled. Also the auditor of the state shall notify the attorney general, who will bring suit against the delinquent sand dealers and collect from them the amounts they owe the state on their contracts.

Mr. Knapp is now investigating all sand companies.

Pit and Quarry

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Published Monthly

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GOVERNOR LOWDEN of Illinois appears to feel that he has executed a fine piece of strategy by securing a cost estimate which seems to prove that cement could be sold in Illinois at $1.45 and still make all the profit which such a business ought to show. But the engineer who prepared the figures thought he was getting up a statement to be used in a prospectus for floating the stock of a new company; and under the circumstances even a fairly reputable engineer will sometimes shade his figures a little, condoning such action by the thought that the public will not take them at face value any way. We do not relish the idea of the governor adopting gum shoe methods to accomplish results; but if he wants to go into that kind of thing, let some of his sleuths get jobs with the accounting departments of the cement companies and gather some honest-to-goodness figures. They might be different.

Revision of Demurrage Rules

IN CONNECTION with the proposed recodification of the standard demurrage rules, by the railroads, it has been urged by some of the producers, that section "B," under the head of Exemptions, be extended to include empty cars, placed for loading sand and gravel at pits, also cars under load with sand and gravel at pits or on pit sidings. It is urged that the same exemption privilege which is extended to coal operators regarding empty and unbilled cars, should be given to the pit and quarry industry.

In the distribution of empty cars, sand and gravel pits are now considered by most roads on the same basis as coal mines, and equipment is pro rated according to total supply on hand. If for any reason cars placed for loading on any one day are held empty until the following day or longer, such cars are counted against the daily requirement of the pit until they are finally loaded and disposed of. For that reason alone, we feel that it is unjust and unreasonable and an undue penalty on the industry, for carriers to assess demurrage on empty cars held for loading sand and gravel at pits or on pit sidings.

Conditions under which sand and gravel is produced are very similar to those affecting the coal industry; many of our operators grade their material into six or eight sizes, but get, from day to day, varying percentages of each grade; there is no way to produce any one grade on a given day, but the deposit must be taken as it comes, and as in the case of coal mines we frequently have trouble in disposing of certain grades; when orders are scarce or sales are long or short on one or more grades it is necessary, in order to get a full day's run, to load all material produced; otherwise those grades for which

there might not be immediate demand would have to be rehandled twice, which would be prohibitive because of the very small margin of profit on which most of our plants are operating.

It has been repeatedly asserted by the carriers that demurrage charges are not assessed for revenue, but to create an incentive for the prompt release of equipment. As applied to empty cars placed for loading sand and gravel and loads held for billing, the only effect of demurrage is to unduly penalize our industry. The need of track room is sufficient incentive for the producer to make every effort to move his material promptly, and more often than otherwise, he also needs the money.

Further, we not only use the same class of equipment as is employed in loading coal, but ninety per cent of our production is during a season of the year when cars are very plentiful and would otherwise be idle on storage tracks of the carriers. Therefore it can be asserted that demurrage as applied to pit and quarry products is nothing but an arbitrary and unjust tax on the industry.

THERE is no need for us to go into the sand and gravel muddle into which the city council of Detroit has fallen; but the incidental statement of one of the bidders is of interest. He said:

"I have always refused to discuss prices with my competitors, and I certainly shall not do so now. Two or three months ago my company was approached by the president of another supply company, who wished us to talk over prices with him. I was in California at the time and his letter was forwarded to me. I immediately telegraphed to my people in Detroit by no means to enter into any discussion with him upon prices."

"Excessive Freight Rate a Disease!"

THE above is one of the forcible expressions which A. P. Sandles, secretary of the National Crushed Stone Association, has coined to use in the fight on high rates.

His first use of it was in his telegraphic correspondence with the Industrial Board at Washington, when he was asked to give representative stone prices in various parts of the United States applying in 1916, 1918, and at the present time.

At that time he wired the Industrial Board:

Many stone operators look upon Industrial Board's request to lower road material prices as a counter move to force us to withdraw righteous request for lower freight rates. We have no price figures to submit at this time. Our books and records are open for inspection as to cost production and profit at all times. Rate reduction should come immediately. Price investigation can follow later. The damnable delay in announcing a definite program and rate reduction is winning the condemnation of every public spirited business man. Revoking ballast orders is disorganizing many crushing plants. A halting vascillating policy on the part of some body will cause some plants to remain closed for the season and in the end force ballast and other stone prices higher. Rate reduction has nothing to do with price material reduction. Our association has nothing to do with prices. Every operator is independent. In many cases an honest investigation of cost production with fair profit margin will justify an increase rather than a decrease in crushed stone prices. Excessive freight rate is a disease.

Want to Wait?

AFTER the Civil war it was thirteen years before prices returned to their pre-war level. But who wants to wait thirteen years for the structures that are needed now?

Why, Mr. Hines?

AT HIS talk before the lumber congress in Chicago in April, Director General Hines of the Railroad Administration gave the routine through which new rates must go in order to become effective.

Such rates, according to the director-general, are initiated by the division of traffic—*of the Railroad Administration.*

They are then submitted for approval to the division of public service. This latter is a comparatively new department, instituted supposedly to represent the shipper—*but appointed by and drawing salaries from the Railroad Administration.*

If these two divisions of the administration agree, the rate goes into effect. If they do not agree, the case goes for final decision to the director-general—*another factor of the Railroad Administration.*

Mr. Hines appeared not to see any incongruity in this virtual ex parte method of establishing rates. But it is needless to say that a bunch of men who are in such close and constant touch with the railroads as the big lumber manufacturers and dealers of the country were not slow to discover the fallacy of the plan.

On the same occasion, Mr. Hines undertook to justify his attitude in refusing to sanction the general purchase of steel by the railroads—because he felt that the low point had not been reached. In other words, the man at the head of the biggest buying organization in the country, himself an official of a government which is, in some of its branches, urging the speeding up of industry in order to equalize labor and prevent social unrest, has fallen in with the popular Micawber idea and is waiting for something to turn up, instead of setting an example of confidence and forward movement.

We know little of the justice or injustice of the price agreed upon by the steel producers. By men who claim to know, it is said that the new price for steel rails leaves a smaller profit than when these rails were sold at $30 a ton. At least the Industrial Board was satisfied; and Mr. Hines has not given any adequate reason for refusing to accept the price as final and letting his big branch of industry set the pace for others.

SOME of the newspapers have developed a habit of mentioning the "stone trust" and the "sand and gravel trust," just as though they knew what they were talking about. And in the belief that there are such animals as the aforesaid trusts, some state and county officials in various parts of the country have canvassed the situation relative to opening up plants of their own. Private cement plants also are planned to curb the violence of the "cement trust." All of which is taken with considerable seriousness by the officials interested; but their present seriousness is as nothing to that which might befall them with a plant on their hands, "eating its head off," like a horse in winter time, and produing nothing in return.

ONE of the noted sayings of American history can be paraphrased to suit the present situation. *The way to resume industry is to resume!*

An Illinois monument concern has secured the services of a preacher as general sales manager. Now if it can add an undertaker to its staff it will be pretty well equipped for handling a job from start to finish.

Overburden Quarried With Cement Rock

THE chemical composition of the overburden is of considerable importance. If the underlying rock is a high-calcium limestone requiring the addition of clay or shale, it is possible that the overburden may be used as a constituent of the raw mix. Under such conditions stripping may not be necessary. Instances have been observed where a depth of 2 to 4 feet of clay or weathered shale is not removed from the rock surface, but is shot down and loaded with the rock. There are two objections to this process which condemn it in the minds of some operators. First, in wet weather the clay makes the rock muddy and difficult to handle and crush, particularly where gyratory crushers are employed. In the second place, the presence of large quantities of clay, which are often imperfectly mixed with the rock, makes it difficult for the chemist to maintain a uniform mixture. This is the statement of Oliver Bowles of the U. S. Geological Survey.

It is doubtful whether shooting down a thickness of 2 to 4 feet of clay with the rock is advisable. However, the fact that clay is one of the constituents commonly added to limestone to make cement obviates the necessity for clean stripping in many places, and thus relieves the quarryman of an operation which is usually tedious and costly.

Where the depth of overburden varies in different parts of the quarry, the feasibility of shooting down the overburden with the rock depends to some extent on the method of quarrying. In one Kansas quarry the overburden varies in thickness in different parts of the quarry from a few inches to 10 feet. At one time the overburden was shot down with the rock. Hand-loading methods were then employed, and while some cars were loaded with an excessive amount of earth, others from that part of the quarry where the overburden was thin were loaded almost entirely with rock. By sending the cars to the crusher in proper order, a uniform mix was maintained. Later a steam shovel was introduced for loading rock in the quarry, hence the rock could be taken only from one part of the quarry at one time. If the overburden at that place was thick, the proportion of clay loaded with the rock would be altogether too high. Therefore, it was found necessary to put another steam shovel on the surface and strip the rock mass. Rock quarried from all parts of the face was then relatively free from clay, the necessary amount of clay or shale being added at the cement plant.

Where it is desired to use the rock without admixture with stripping, the surface should be stripped back far enough from the face to prevent masses slipping into the pit. An instance was observed where soil had slipped into the quarry and was later removed by the slow and tedious hand-shovel and dump-cart method. It is much better to employ the most efficient stripping means possible, and to strip a fairly wide surface ahead of rock-quarrying operations.

In several quarries, notably in Illinois and Kentucky, a shale bed underlies good limestone, and when the limestone is removed in quarrying, the shale is rendered available.

Because the hostilities are over do not shift into careless spending.

Bagging

"The Valves The Thing" No. 4 How to Speed

Cut Your Bagging Cost

by speeding production. The Bates System of bagging with Bates Valve Bags **speeds production,** because it eliminates costly operations, reduces labor and increases human efficiency. The Bates System delivers accurately filled, sealed bags faster than any other method.

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ng Talks

eed Production

The Bates Valve Bag

stays sealed. No ties to come undone nor "ears" to pull off. It is self-sealing and it makes a shapely package of regular and permanent proportions. That's why Bates Valve Bags are handled and stacked quicker than any other bag.

tion Per Unit of Time
Cost Per Unit of Product

why 97% of Lime Manufacturers Use the Valve Bag—the Bates Valve Bag

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ASSOCIATION ACTIVITIES

Sandles Asks Pertinent Questions

Directs Inquiries to Washington, Answers to Which Would Help Solve Rate Muddle

SOME pertinent questions have been sent by A. P. Sandles, secretary of the National Crushed Stone Association, to the director general of railroads and to the Interstate Commerce Commission.

To Walker D. Hines, director general of railroads, Mr. Sandles addresses these three questions:

(1) If it is a matter of public record, will you please advise the various salaries of the 72 men connected with the administrative staff of the U. S. Railroad Administration?

(2) In the matter of present excessive freight rates on highway material, did the Interstate Commerce Commission approve or concur in same?

(3) When, if at all, will there be made announcement by the Railroad Administration that rail rates will either be reduced, remain where they are, or be increased, so as to remove the element of doubt and uncertainty in the minds of engineers and architects in making estimates?

The letter to the Interstate Commerce Commission is as follows:

If public record is made of same, will you please advise salaries paid by U. S. Railroad Administration to its administrative corps of some 72 officials?

The Interstate Commerce Commission has been a student for many years in the matters of rail rates. Will you please advise whether your Commission has approved the present excessive and exhorbitant rates on crushed stone, slag, sand, gravel, brick, cement?

Does your Commission approve continuation of the present state of doubt and uncertainty and quibbling as to whether freight rates will be reduced, increased or remain as they now are?

This state of uncertainty is almost a disease that confuses engineers and architects in making estimates.

Does your Commission approve the action of various so-called freight district traffic committees continually sending out notices for hearings and threatening to increase rail rates on various commodities?

Are such hearings at the suggestion of Government officials or do they originate from other sources? If so, where?

Stone Puts Case Up to Chambers

Illinois Association Director States Situation Plainly to Railroad Traffic Men

THE letter given below was recently addressed by Ben Stone, business director of the Illinois Sand and Gravel Producers Association, to Edward Chambers, director of the traffic division of the U. S. Railroad Administration. It is as follows:

Statement issued by the Director General on March 20th, that no reductions will be made in freight rates on building materials except that reductions are being contemplated on rock, crushed stone, sand and gravel for public work, but that even these reductions will not be made until after it is certain that material men will make a reduction in prices, is disappointing, not only to the producers and manufacturers of materials involved, but to everyone concerned in their use.

Confining my remarks to sand and gravel, I would respectfully call your attention to the fact that rates now in effect were made for the purpose of discouraging production during war times, and in that respect they have had a most far reaching effect. Production in 1918 was less than half of normal and a number of the plants in Illinois operated at a loss on account

of small production and heavy overhead.

The construction program of the entire country is waiting for a reasonable basis of freight rates. From all parts of the country we have reports of extensive building and construction projects. In the state of Illinois alone, plans involving the expenditure of more than $225,000,000 are being delayed. Virtually all of this work is held up because of high prices, and in spite of efforts that have been made by all concerned, including various departments of the federal government, to get it started.

Control of the entire situation is so largely in the hands of the railroad administration that it is extremely difficult to understand the attitude that has been taken as regards freight rates.

In the production of our materials the greatest element of cost is labor. The railroad administration, with the approval of the President, has fixed a standard rate for common labor, with which all lines of industry must compete.

The distribution of our products is controlled almost entirely by freight rates, and here again the railroad administration has full power.

We would respectfully ask you, Mr. Chambers, to consider the effect, not only on the sand and gravel industry but upon the entire industrial fabric of the country and the revenues of the railroads as well, if the prohibitive, war-time rates on building materials are maintained.

If the lack of demand continues, there will be no production; there will be no traffic of this nature for the railroads to handle, and likewise no revenues from such traffic. Are you not crippling, at least, the goose that lays the golden egg? I am sure you are fully aware of the desirable features of sand and gravel traffic as a revenue producer for the railroads during the spring and summer months, and I shall not attempt to elaborate on that. I only wish to point out to you as far as I can, the general effect of the present basis of rates, which has already made itself apparent.

In normal times every sand and gravel pit in the state of Illinois would be running at full capacity with large orders ahead. A number of our plants which were started in March, in anticipation of the return of normal conditions, now report that they are running only two or three days a week and have no business to speak of, ahead. In other words, they are living from day to day, and so far, most of them have operated at a loss. And this, in spite of the impression which seems to have gained credence in a great many quarters, that prices are on an unwarranted high level.

Unless we can obtain a basis of freight rates that will permit our materials to move freely, we cannot hope for anything other than a serious curtailment of production. Why not place our rates on a basis 25 per cent above what they were prior to June 25, 1918, when other commodities were increased 25 per cent and an increase of from 50 to 100 per cent was attached to rates on sand and gravel and kindred materials?

I wish to assure you that the question of freight rates is a very vital one right now to this industry, and would respectfully and earnestly urge that the proposed reduction be given favorable consideration.

Date Set for Lime Meeting

It Will Be Held at William Penn Hotel, Pittsburgh, June 18 and 19

BY vote of the board of directors of the Lime Association, the annual meeting has been set for Pittsburgh, June 18 and 19.

It will be held at the William Penn Hotel, as was arranged for the meeting there in February.

Members who expect to attend the annual meeting are asked by the manager, Robert H. Hall, to make their hotel reservations through the Association because it has reserved a large number of rooms in the hotel for the benefit of member companies.

Details of the program, as they develop, will be announced to the industry.

Illinois Sand and Gravel Producers Association

UNIFORM COST STATEMENT

Firm.....

.....**Plant.** .....**1919.**

.....

Tons produced, all grades..... **Days worked**.....

	PRESENT MO.			TOTALS TO DATE		
	Items	Totals	Unit	Items	Totals	Unit
ADMINISTRATION						
1. Association dues						
2. General Expense						
3. Interest						
1.						
2.						
3.						
4.						
4. Salaries						
1.						
2.						
3.						
5. Taxes						
1. Corporation						
2. Income						
3. Personal						
4. Real Estate						
OFFICE EXPENSE						
1. Depreciation—office fixtures						
2. Salaries						
3. Rent						
4. Traveling Expense						
5. Telephone and Telegraph						
6. Supplies						
7. Miscellaneous						
SALES EXPENSE						
1. Advertising						
2. Telephone and Telegraph						
3. Traveling Expense						
4. Salaries						
5. Miscellaneous						
OPERATING EXPENSE						
A. Administrative						
1. Depletion or Royalty						
2. Depreciation						
3. Demurrage						
4. Insurance						
5. Obsolescence						
6. Switching						
B. Direct Operating						
1. Fuel						
2. Labor						
1.						
2.						
3.						
4.						
5.						
6.						
3. Pit General Expense						
4. Power						
5. Repairs and Supplies						
6. Stripping						
TOTAL COST						

Uniform Cost Sheet

Illinois Association Has Recommended this One to Its Members

THE cost sheet here shown has been devised by Ben Stone, business director of the Illinois Sand and Gravel Producers Association, for the use of the members of that organization, so that they can all be working on a uniform basis and talk in the same terms when they get together.

With a uniform sheet of this kind, there can be no argument as to what constitutes operating expenses and what is to be charged to administration or "overhead."

As soon as the system has been reviewed by members of the association, and any changes made which seem to be for the betterment of the plan, it will probably be adopted by most of the Illinois producers.

Recommended Form of Quotation

Wisconsin Association Seeks to Standardize the Practice of Its Members in Making Bids

AT THE last meeting of the Wisconsin Mineral Aggregate Association, O. C. Hubbard, executive secretary, presented a form of quotation for the use of the association members.

It is in the nature of a letter, the body of which, is as follows, with opening and closing paragraphs to suit each case, as desired by the member:

DEAR SIR:

Beg to quote you on Stone, Sand or Gravel, as follows:

Quantity: All the Stone, Sand or Gravel required to complete construction of .....
estimated.....tons.

Time of Delivery: Shipments to be made prior to January 1, 1920, on your instructions and as required by the progress of the work.

Price: .....

This quotation is for your acceptance within fifteen days after award of contract but not to exceed thirty days from this date and is subject to terms and conditions appearing on the back hereof.

If accepted in writing this quotation constitutes a contract.

Yours very truly,

Accepted:
Date.....
Company.....
By.....

The plan contemplates the printing of the following on the back of letter heads on which proposals are made:

TERMS OF PAYMENT: Net cash in 30 days, or five (5) cents discount for cash on or before the fifteenth of the month following date of invoice.

If at any time the financial responsibility of the Purchaser becomes impaired or unsatisfactory to the Seller, it reserves the right to require payments in advance or satisfactory security or guarantee that invoices will be paid when due.

If Purchaser fails to comply with terms of payment or with any of the other terms of sale, the Seller reserves the right to cancel unfilled portions of any contract or order, Purchaser remaining liable for all unpaid accounts.

SHIPMENTS: Purchaser shall give Seller shipping instructions a reasonable time before shipments are to be made, and the Seller shall not be responsible for delays in production or shipping caused by strikes, differences with workmen, accidents at its plants, weather conditions, inability to secure cars, coal or other material, or other contingencies not under its control, nor for any delays in transportation.

If Purchaser fails to take the material within the time agreed upon, the Seller reserves the right to extend the time, but shall not be obliged to do so.

FREIGHT: In the event of an increase or decrease in transportation charges or war tax thereon from point of shipment to place of delivery, the amount of such increase or decrease shall be added to or deducted from the price of all material shipped during the period in which such changed transportation charges or war tax are in effect.

"It is a known fact," says Mr. Hubbard, "that in a great number of cases the sand and gravel business has been more or less of a verbal transaction to be withdrawn or extended by either party whenever desired. Where quo-

tations have been made in writing, no time limit was included for acceptance.

"I worked up this form rather hurriedly and it is quite possible that in the dictated letter some of our members may improve upon it. My intention was that the recommendations on the back be printed on producers' letterheads, the front being only a sample of the letter to be written. The word 'Stone' is to be used when a stone producer is quoting, and 'Sand' or 'Gravel' when a sand or gravel producer is quoting."

This form was a part of a movement by the Wisconsin association to standardize business ethics among the members.

Other points brought out in the report on this subject were: A recommendation that a report of every sale for specific work be recorded with the executive secretary; that the promiscuous giving of quotations be discouraged; favoring the open-price plan of selling; protection of the dealer; the allowance on carload lots of a discount of 5 cents per ton if paid on or before the 15th of the month following delivery.

Charles F. Gallagher, Herbert S. Gay and Edward J. Karp have incorporated the Bridgeport Sand and Coal Company of Detroit with a capital of $10,000.

The Buffalo Gravel Corporation, Buffalo, New York, has incorporated with a capital of $250,000. James N. Carroll, Samuel J. Dark, David Hyman, Daniel Knowlton and Morris S. Tremaine are the directors.

The Stilwell Sand & Gravel Company of Anderson, Ind., has incorporated to mine and excavate for gravel with a capital of $100,000. The incorporators are: Thomas N. Stilwell, E. N. Hill, N. M. McCullough, Rex D. Kaufman and Wade H. Free.

Fewer Delivery Stations with Motor Trucks

Possibility of Longer Hauls Makes Delivery from One Point Feasible

THE Lake Shore Stone Company of Milwaukee at one time had three stations to which its product came from the quarries and crushing plants, and from which it made deliveries.

Then the company threw out its horses and wagons and adopted motor truck haulage.

Pretty soon it was discovered that one of the stations could very profitably be closed, thus reducing the overhead expense, as it was no longer necessary to provide for such short hauls in order to make deliveries economically and on time.

Now another of the stations will be discarded as soon as the lease runs out, and all deliveries made from one place.

Such is the ability of the motor truck to get things done.

Lime Association Gets Soil Specialist

Professor Fippin Leaves Cornell University to Join in Work of National Scope

ELMER O. FIPPIN, professor of soil technology of Cornell University, will become director of the agricultural bureau of the Lime Association at the close of the present collegiate year.

Professor Fippin graduated from the College of Agriculture of the Ohio State University in 1900. For the next five years he was an assistant in soil survey of the U. S. Department of Agriculture and made soil surveys in the following states: Massachusetts, Connecticut, New York, Maryland, Georgia, Florida, Michigan, Iowa, Missouri and North Dakota. From 1905 until the present time, he has been assistant professor and professor of soil technology at Cornell University. During seven years of this time he gave all the resident courses in soils in the university and developed extension activities of the Agricultural Department.

Since 1912 he has confined his attention to extension work and the supervision of the soil survey of the state. He is author of a number of bulletins on soils published by Cornell University and joint author of the following books: "Principles of Soil Management" and "Soils, Their Properties and Management." He is the author of five chapters on soils, their character and improvement in "Cyclopedia of Farm Knowledge." He is a member of a number of scientific and agronomic societies.

In making this change, Professor Fippin believes that the opportunity for constructive work in improving the soils of the United States and in increasing their productivity is greater with the Lime Association than with Cornell University because of the broader scope of its activities.

Elmer O. Fippin

Agriculturists generally throughout the United States will be interested in knowing that thus a nationally recognized authority on soils becomes available to them through the enterprise of the Lime Association.

Silica Men See Good Prospects

The regular meeting of the Silica Sand association of Illinois was held April 4 at the offices of the association on the fifth floor of the Central Life building at Ottawa. Each of the nine sand firms in the association was represented and the meeting was the most successful one held this year.

The association secretary, Paul L. Vittur, made his regular report and he spoke on the promising season for the sand business this summer. Steel and cast iron foundries and manufactories that have been temporarily closed down owing to the reorganization of many of the businesses on a peace basis, will soon resume operations and the sand business will again boom.

Says Hines Dams Stream of Industry

Lumber Manufacturers Blame Him for Not Getting Big Construction Program Under Way

CHARLES C. Parlin, manager of the Commercial Research Division of the Curtis Publishing Company, Philadelphia, focussed the collective thought of the men who attended the recent Lumber Congress in Chicago when he stated that "there never was a time when so many people were thinking about building and not doing it."

This trite expression of the situation brought enthusiastic applause, for it furnished in the fewest possible words the reason for the large and attentive attendance at the congress. These men all realized that there is a big potential business just waiting to be precipitated, and they were earnest seekers for the magic formula to bring about the event which everyone is hoping for.

This is why they were in such desperate earnest in their candid and vigorous statements to the director general of railroads after he addressed them. They felt that it had been in his power, especially in the steel price controversy, to press the button controlling the currents which move industry, and that at this crucial point he had wavered and continued to wait with the uncertain multitude.

Mr. Hines easily sensed the temper of the men he addressed at the convention, and he knew that they were not in sympathy with his policies, especially after R. A. Long, the big Kansas City lumberman, got to asking him why he saw fit to disagree with the Industrial Board on the price of steel, and thus not only put a stop to any general construction plan for the immediate future on the part of the railroads, but by this action serve to continue the feeling of uncertainty in the minds of the public also.

"It's my opinion," said Mr. Long, that Mr. Hines has dammed the entire stream of industry in the United States by his refusal to make purchases under the existing prices. I believe he has erred on the wrong side. He would have done better to let the railroads buy steel and get business back on its feet again."

Mr. Hines parried by replying that his advisers had not been satisfied that the price fixed by the steel producers was not an artificial figure unwarranted by after-war conditions, and that he refused to be a party to delivering the public to unjustifiable extortion; but the temper of the convention was clearly to the effect that it would have been much better to have come to some terms, even though not entirely satisfactory to everyone, whereby the price of at least one material might be considered definitely fixed for the season, so that construction might proceed.

President John H. Kirby, of the National Lumber Manufacturers Association, addressed Mr. Hines from the chair in opposition to the railroad policy on the steel question, saying that he was in Washington at the time the matter was being threshed out, and that all the evidence seemed to show that at the price quoted the steel producers would make less profit on their output than when they were selling at two-thirds the figure before the war.

"We want you," said Mr. Kirby, "as our representative, as the representative of all the people, to say to the American people as far as your voice extends that in this hour when we are seeking a transition from a war to a peace basis, in this hour when industry is halting, in this hour when labor is afraid, in this hour when the minds of business men are confused—we

want you to say to them, 'The biggest buyer in this country is going to start the wheels of progress.' And if you say that today, the wheels will start turning tomorrow."

Mr. Hines spent much of his time in outlining the general policy of the Railroad Administration and in telling what it is trying to accomplish. With reference to the buying of materials, he said that the purchasing departments of the different roads will continue to do the buying as heretofore; that there will be no attempt to exert any crushing effect on prices by centralizing the purchasing power.

With reference to the price of steel, he stated several times that he had hoped the figures decided upon by the steel people would be so low as to carry their own conviction to the people that they were on a reasonable post-war plane; and failing in this, as he seemed satisfied was the case, he appeared content to look upon the matter as finally determined and without any possibility of adjustment.

It was probably right at this point that the lumbermen took sharpest issue with him, if their mental processes might have been analyzed; for a majority of them undoubtedly thought that an exercise of diplomacy and a willingness to make some concessions might have averted a break at this critical period.

The Atwood Davis Company has let a contract for a concrete road to connect its plant at Beloit, Wis., to the paved city street. This road will be about one mile long and will facilitate rapid hauling of sand and gravel from the pits.

The Sand Products Corporation has just been incorporated in New York with a capital of $100,000 to handle sand, gravel and cement. J. B. Morrow, S. B. Klee and J. Galiani are the incorporators.

Back With Zelnicker

Lieutenant-Commander H. J. Elson, U. S. Naval Reserve force, has been released to inactive status and has resumed his civilian work as secretary and treasurer, Walter A. Zelnicker Supply Company, St. Louis,—with which company he was in charge of internal management and manufacturing operations.

Lieut.-Comdr. Elson was graduated from the U. S. Naval Academy in 1898 and after service in Cuba, the Philippines and China, resigned from the Navy in 1902 to become interested in

H. J. Elson

the Zelnicker Company. He was chief engineer of the Missouri Naval Militia, with which organization he was mobilized into Federal service upon the declaration of war.

His assignment was inspector of machinery, 9th, 10th and 11th Naval Districts, with headquarters at Chicago, where he had charge of the design and conversion to salt water use of the machinery department of Great Lakes vessels, taken over by the Navy Department, among which were the well known boats, City of South Haven, Virginia and Puritan, as well as rehabilitation and design and installation of new machinery in the ill-fated Eastland, now named U. S. S. Wilmette and called by her crew "The queen gun-boat cruiser of the navy."

Production of Pebbles for Grinding

Natural Product Comes from California—Artificial Pebbles Made in Iowa

A FALLING off in the production of pebbles and liners for use in tube mills, as shown by final figures for 1918 compiled by the United States Geological Survey, Department of the Interior, reflects both uncertainty of market and changes in grinding practice.

Natural pebbles for grinding rock, ores, minerals, cement clinker, and many other materials were obtained in 1918, as in preceding years, from the beaches between Oceanside and Encinitas, San Diego County, Calif. According to reports received by the Survey, the entire output was marketed by Robert Burns & Co., Oceanside; the Pacific Coast Pebble Co., Encinitas; and Thebo & Tingman, Encinitas. The production of these pebbles in 1918 was considerably smaller than in 1917, probably in large part because the growing use of steel balls is supplanting the use of pebbles, but the decrease was due in part to the uncertainty of the market, which deterred pickers from collecting and sorting stocks that they might have marketed.

The output of "artificial pebbles" in 1918 was considerably greater than in previous years. These so-called artificial pebbles are either roughly cubical or mechanically smoothed and rounded blocks of quartzite manufactured by the Jasper Stone Co., Sioux City, Iowa, or mechanically smoothed and rounded blocks of silicified or chalcedonized rhyolite manufactured by Omer Maris, Manhattan, Nev.

In 1918 the sales of pebbles and of cubes and artificially rounded blocks for use in grinding amounted to 9,734 tons, valued at $82,350. This was a decrease, roughly, of 2,300 short tons, or nearly 20 per cent, compared with the sales in 1917. The value, however, shows an increase of nearly $24,000, or about 30 per cent, compared with that for 1917. Besides this marketed output there was an indeterminable consumption, probably large, of substitutes for grinding pebbles by mills which used local pebbles, boulders, lumps of ore, or native rocks.

Only estimates are available to show the quantities of flint pebbles imported. The records of the Bureau of Foreign and Domestic Commerce indicate that the quantity of grinding pebbles imported in 1918 was probably a little over 10,000 short tons, about 70 per cent of which came from Denmark and the remainder from France.

The total new supply of grinding pebbles contributed to domestic markets in 1918 appears thus to have been about 20,000 short tons, as compared with approximately 25,500 tons in 1917, 32,000 tons in 1916, and 31,000 tons in 1915. This diminishing supply is evidence of the growing use of steel balls or other substitutes for grinding pebbles.

The domestic output of flint or quartzite tube-mill lining in 1918 was 2,535 short tons, valued at $46,634, compared with 3,050 short tons, valued at $59,250, in 1917. In 1918 there were only two producers—the American Flint Co., Iron City, Tenn., and the Jasper Stone Co., Sioux City, Iowa.

The Interstate Gravel Company, Inc., has been organized in Baton Rouge, La. The company has purchased the Foster Creek gravel holdings near Gloster, Miss. Offices and distribution plant will be maintained in Baton Rouge. The incorporators of the company are George K. Force of Alexandria, La., president, and I. W. Troxel of Rockford, Ill., treasurer and general manager.

Richard H. Hughes, vice-president of the Crescent Portland Cement Company, Wampum, Pa., died suddenly, April 12, at the Pennsylvania station in New York.

Developing New Deposits of Glass Sand

Pennsylvania Company Extending Its Operations—Some of the Product Mined Underground

THE Pennsylvania Glass Sand Company, Lewistown, Pa., is preparing to develop a large tract of flint glass sand near Huntingdon, along the main line of the Pennsylvania Railroad; also other tracts along the state line between North Carolina and Tennessee.

The future of silica sand looks exceptionally bright since late developments prove that it can be utilized in the manufacture of tubes or pipe for conveying strong acids that would cut steel or iron in a few hours' time.

Flint glass sand, as it was then known, was discovered by Peter Wertz, an aged farmer residing along the ridge three miles west of Lewistown, in 1868. He sold his rights for a mess of pottage, or, in other words, about $2,000.

The product was hauled in wagons a distance of four miles to be loaded on cars for shipment. This continued a decade, when a tramway was built that conveyed 100 tons daily to the cars at Granville.

The present company was organized in 1902 with S. S. Woods, of Lewistown, as president and general manager, and now operates mines at Granville, Vineyard, Mapleton, Mill Creek, Pa.; Berkley and Hancock, W. Va., and Williamstown Junction, N. J.

The mines operated near Granville are the only ones owned by the company that extend any distance under ground; they have two drifts at this point, and both are in excess of a mile and a half under the surface.

This sand is used extensively in the manufacture of French plate glass. The vein is 200 feet thick and stands at an angle of 45 degrees. The pressure has been so great that the sand has solidified into flint rock that will turn the point of a miner's pick if struck into it at the headings, but as soon as the pressure is removed it slacks away like lime and prepares itself naturally for the washers and driers, thus retaining the grain intact.

The Pennsylvania Glass Sand Company employs 600 men, and have a capacity of 3,000 tons daily, and are at present installing crushers at Mapleton with a capacity of an additional 1,000 tons daily.

Cement Rate Adjustment

Owing to the Lehigh Portland Cement Company's complaint asking for the readjustment of cement rates from Mason City to destinations beyond the Twin Cities, the Universal Portland Cement Company has asked for the re-opening of Docket No. 8182, the summoning of Director-General Hines, and the consolidation of the Lehigh complaints in the general investigation, so that if a readjustment be undertaken from Mason City the Commission will also consider the adjustment of rates from Buffington and Steelton, because the Universal, from those mills, competes with the Lehigh in the territory to which the Lehigh asks for a readjustment different from that proposed in the report in No. 8182. It also asks for an investigation of switching costs at Chicago, St. Louis and Duluth to balance the investigation of switching costs suggested by the Atlas Company.

The Ash Grove Lime & Cement Company resumed operation at its plant at Chanute, Kansas, the early part of April after a shutdown of two weeks. This shutdown was caused by labor trouble.

George H. Balfe of Lafayette, Ind., has taken over the plant of the Monon Crushed Stone Company, Monon, Ind., and has equipped it with additional machinery to increase its capacity.

Detonators for Blasting

By J. B. Stoneking

THE great power contained in high explosives, by virtue of which they rend and shatter even the hardest and toughest rock and thus make possible the great engineering and construction achievements of man, would not be available were it not for the activities of the little detonator commonly known as the blasting cap. Among many blasters who work with and handle explosives daily, too little is known about detonation, and even scientists and chemists who have spent years in experiment and study are not able fully to explain the phenomenon. However, long series of investigations have been conducted and many thousands of tests made which, though sometimes ending in serious accidents, have thrown considerable light upon the subject.

A simple explosive like black powder releases its full power by burning only, while the complex high explosives, like nitroglycerin, picric acid, dynamite, trinitrotoluol (T. N. T.) and guncotton, do not. For instance, dynamite, when simply ignited in the open air, will, if not disturbed, burn quietly with a large amount of smoke and fumes; if strongly confined, it will partly though weakly explode and partly burn with considerable smoke; but, if given a quick, heavy shock like that from a blasting cap, the explosion is strong and there is almost no smoke.

This last effect is called detonation, and it has been found that the more complete the detonation, the greater is the power obtained from the dynamite. Several theories, which are difficult to understand and leave much to be desired, have been advanced regarding detonation and its causes. Some insist that the almost instantaneous breaking up of the solid compounds into their chemical elements and the recombination of these elements into gaseous compounds is simply due to enormous mechanical pressure momentarily applied and accompanied by great heat. Others maintain that the action is one of vibration, which sets up waves or impulses, and that these waves must be of certain length and intensity to secure the best results. As an example of the latter, the familiar hollow glass ball experiment used in physical laboratories may be cited. This ball will withstand rather severe blows without breaking, but the vibration of a certain musical note near it will shatter it into pieces, while the vibration of a lower or higher note will not affect it. That there may be some foundation for both of these theories is shown by a number of experiments with different detonating substances or agents and their effect on high explosives of various compositions. These experiments have, from time to time, been carried on by the governments of different countries, the United States Bureau of Mines, private investigators and manufacturers of explosives.

As all high explosives at present in use, when manufactured so as to be safe for transportation and ordinary handling, require an intermediate agent to give them the initial shock for complete detonation, various highly explosive substances have been developed for this purpose. Among

those detonating agents that have proven of sufficient value to be developed commercially may be mentioned fulminate of mercury, chlorate of potash, dry guncotton and lead azide.

That the efficiency of any one of these agents depends upon the particular high explosive with which it is used, has been shown quite conclusively by numerous experiments. For instance, less fulminate of mercury is required for detonating T. N. T. than for tetryl, while more lead azide is required for T. N. T. than for tetryl. This shows that fulminate is more efficient for T. N. T. than it is for tetryl, while lead azide has more effect on tetryl than on T. N. T. Again, silver azide is more efficient for picric acid than for guncotton, while fulminate of mercury acts with greater effect on guncotton than it does on picric acid. From this it will be seen that a given detonating agent does not possess the same efficiency for detonating all explosives. The manufacturers of all kinds of high explosives and dynamites recognize this fact, and accordingly make tests of blasting caps and electric blasting caps containing different quantities and mixtures of detonating compounds, in order to secure the agent which will give the greatest efficiency for use with their particular brands of explosives. Such being the case, it often happens that the detonators and blasting supplies placed on the market by one manufacturer, while giving excellent results with explosives of the same manufacturer, will not do so well with explosives of another manufacturer, owing to a difference in the explosive ingredients. Hence, it is generally of advantage to the user of dynamite and similar explosives to purchase detonators of the same manufacturer. This should not only give greater efficiency from the explosives, but will enable the user to properly place the blame should any of the materials be defective.

Formerly, with the old-style Kieselguhr dynamites, the detonating agent used was fulminate of mercury alone, and blasting was made stronger or weaker by varying the amount of fulminate. Thus a standard scale of strength was established, which still remains for the comparison for blasting cap strengths. Later it was discovered that something more than mere strength was needed, which, for want of a better definition, might be called vibration frequency, or wave length, to properly detonate the modern, more complex explosives with their various ingredients. Blasting caps and electric blasting caps nowadays consist of mixtures of various detonating agents, in order to secure this effect, but are still graded and compared in simple strength similarly to the old cap containing fulminate alone.

Electric blasting cap.

The detonating substances are very much more sensitive than the explosives with which they are used, hence their manufacture is attended with greater risk, and the most minute attention must be paid to safe processes and safety rules. Many of the agents experimented with are so sensitive as to preclude their manufacture on a commercial scale, some exploding violently upon merely touching them, this characteristic naturally prohibiting their use.

Lime and Cement Prices Stabilized

New York Manufacturers Pass Buck to Investors in Hope of Stimulating Construction

BY A single stroke, responsibility for backwardness of the 1919 building season has been shifted from the building material manufacturers in New York to the investors themselves, according to the Dow Service Daily Building Reports.

This notable change from what appeared to be a hopeless situation, as far as anything like a normal building outlook was concerned, to one roseate in its possibilities for a full building season resulted from two important meetings held by the Portland cement and barrel lime manufacturers supplying the New York market.

Both these industries had taken careful surveys of the building situation in New York and in cities east of the Mississippi and the reports showed that building construction has been retarded by the general expectation that building material prices were not only out of reach now, but would be much higher after the building season opened. For fear of accentuating this building movement, many private projectors decided not to build at all, and the result was that only about 40 per cent of normal construction work went ahead and nearly seven-tenths of that which did proceed was alteration work. A large proportion of the projected work was in the form of necessary commercial or industrial expansion, while one of the chief needs of the day is for a freer market for the construction of small homes. Other owners were informed by estimating contractors that the building market would go up this summer and prices would be higher than anything heretofore attained. Frightened by possible delays through strikes and inadequate delivery facilities on railroads and steamships, the builders either withdrew from the market or went into the alteration market.

Recognizing the tendency of the times in this regard, the cement manufacturers agreed to guarantee the market against any higher prices than the $3.25 delivery level for New York for the remainder of the year. In other words, the market may rest assured that Portland cement prices will remain at present levels until December 31, 1919, with the further proviso that if there should be a price reduction in favor of the prospective builder or contractor the various companies, representing ten different establishments in all, would folow the reductions. In other words, if, during the year, any one company should attempt to cut the price, all the other parties to the manufacturers' agreement will follow suit, the plan being strictly in accordance with the efforts of the various Government boards to get building construction work started even though unprecedented means have to be employed to accomplish the much needed building revival.

Acting independently and also in line with the general disposition of building material manufacturers supplying this market to effect a condition of practical guaranty against further price advances this year, the barrel lime manufacturers, representing practically 100 per cent of the trade, have decided to fix the present price level as the guaranteed maximum until September 1, 1919. The date was fixed so as to permit the manufacturers to reach a still lower price level if the quantity demanded by the building market at that time was sufficiently great to permit them to revise their present manufacturing costs on what is termed a quantity basis, in

which event the price would probably be lowered.

In the building sand market a vigorous war is in progress between two rival companies for supremacy.

There is no price quotation in this market, nor in gravel or grit, and in consequence the crushed stone market is ragged.

The controversy between the Industrial Board at Washington and the Railroad Administration left the building market in an unsettled state until the cement and lime interests counteracted it by the magnanimous stand with reference to stabilizing the price market here.

The report of George W. Hackett of Pittsburgh, receiver for the Castalia Portland Cement Company, shows that since he assumed charge of the business of the company three years ago, he has succeeded in wiping out all obligations and indebtedness of the company and has, in addition, accumulated a net profit of about $500,000. The company has now been returned to the stockholders.

The Casparis Stone Company, Connellsville, Pa., recently experienced considerable loss through fire.

The legality of the $60,000,000 bond issue for highways in Illinois has been upheld by the Supreme Court.

"Extravagance rots character; train youth away from it. On the other hand, the habit of saving money, while it stiffens the will, also brightens the energies. If you would be sure that you are beginning right, begin to save."—(Theodore Roosevelt.) Buy W. S. S.

This Device Drains Off Surplus Water

Introduction of Screw Conveyor Provides Dryer Sand on a Construction Job

ATTACHMENT of a simple screw conveyor device to the gravel and sandwashing and screening plant at the Lockington dam of the Miami Valley flood-protection works has successfully eliminated the surplus water carried into the washed-sand bins.

The sand, wet from washing, flows down the sand screen into an inverted cone hopper which it nearly fills. Most of the contained water rises and overflows through a notch in the top edge of the cone. As the cone becomes full, a counterweighted bottom valve opens and lets the contents fall into the sand bin.

Trial showed that the sand going into the bin was too wet, and to remove this excess water the screw conveyor device was attached. Now the sand discharged from the cone falls into the screw conveyor hopper, whence it is carried by the screw conveyor up the inclined conveyor box, and from the top falls into the bin. As the sand is carried upward the water drains back into the hopper and, overflowing a notch in the hopper top, is carried away. The device has been found to work effectively.

Saving Labor in Secondary Blasting

Give Due Consideration to Nature of Formation in Making Primary Shots

THE labor required for secondary blasting depends on various factors, the chief of which are the efficiency of the primary blasting, the physical character of the rock, the method of rock loading, and the method of secondary blasting. These factors are considered in the following paragraphs, taken from Technical Paper No. 203 of the Bureau of Mines, by Oliver Bowles.

If the rock ledge is thoroughly shattered by the primary blast, little secondary blasting may be required. If, however, the primary shot merely fractures the ledge and produces many large solid blocks, much secondary blasting may be needed to reduce the blocks to convenient size. Hence, it is evident that the extent of secondary blasting depends in large measure on the efficiency of primary blasting, and the employment of an expert blaster for primary shots tends to eliminate much of the secondary blasting.

Schistose rock is usually shattered effectively by the primary blast. Where the schistosity is duly moderate the rock has a tendency to split in long thin slabs. Such splitting is known among quarrymen as "slab cleavage." In most limestone quarries, however, the rock is massive and tends to break into more or less cubical blocks. Such rock is said to possess "cubical cleavage." Where steam-shovel loading is employed, rock having slab cleavage requires less secondary blasting than that with cubical cleavage, for a rock crusher will accommodate a larger mass in the form of a long thin slab than in that of a cube. Schistosity, therefore, tends to reduce the need of secondary blasting. In some of the schistose cement rock deposits of the Lehigh district of Pennsylvania, the rock is so thoroughly shattered by the primary blast that little or no secondary blasting is required. Few quarries for the production of blast furnace flux are of this type, as the rock is usually massive.

Where vertical open seams 6 to 8 feet apart cut the rock the primary blast tends to push out large solid masses that require excessive secondary blasting. In such an unfavorable condition at least one of the blast holes for the primary shot should be located in each rock mass between seams, for thereby each mass is shattered. On the other hand, any large mass that is not penetrated by a drill hole is simply pushed out. It is evident, therefore, that the amount of secondary blasting required in connection with unsound rock ledges is largely dependent on the skill employed in primary blasting.

The toughness of the rock is also an important factor in this connection. Tough rock with few seams or bed planes tends to break into large cubical masses requiring maximum secondary blasting. The proper method of dealing with such rock can usually be determined only by experience. By varying the diameter, spacing, and burden of primary drill holes, or by varying the amount or grade of the explosive the blast foreman may be able to arrive at a combination that will promote effective shattering and thereby reduce the secondary blasting needed.

The Alpha Portland Cement Company has resumed full operation at its plant in Manheim, W. Va., and is now employing from 800 to 1,000 men. Work at this plant was suspended for some months, due to war conditions.

To Stimulate Business

Road Building Most Direct Way to Increase Work and Absorb Surplus Labor.

LESS than 45 miles of roads are reported completed by States availing of Federal aid. Appropriations made by Congress to pay the Federal Government's proportion of the cost of State road building projects now total $48,500,000. This soon will be increased materially. An addition of $200,000,000 probably will be available during the next 3 years. With these millions available and with the approval of the Federal Government on 760 road-building projects, involving 7,869.61 miles of roads, less than 45 miles—44.969 to be exact—of roads have been constructed under the Federal Aid plan.

The Information and Education Service of the U. S. Department of Labor, co-operating with such national organizations as the American Automobile Association, the Automobile Chamber of Commerce, and the National Highway Industries Association, is calling to the attention of state officials the desirability of at once getting under way such State road construction as has been approved by the Federal Government and for which the latter has set aside funds.

In addition to obvious benefits derived from improved highways, the Department of Labor urges a new argument, especially important at this time when labor conditions are arousing anxiety and business is endeavoring to find an unembarrassed way back to peace conditions. For the States at once to go in for road building is, according to the Department of Labor, a direct way to stimulate business and absorb labor. To all that has been said heretofore on the value of good roads, now may be added road building's potentialities as an efficacious tonic for the industrial organization of the country.

The Department of Labor does not deny that road materials and labor costs are high. Rather, the Information and Education Service asserts, indications are that prices will remain high for some time to come and, in view of the forecasts for market conditions, it is imprudent to longer hold up State construction anticipating lower construction costs. Secretary of Labor Wilson, both in a recent address in New York City and in an article in Collier's Weekly, expressed the conviction that an era of unprecedented activities is ahead of American industry. He asserted his confidence in the ability of American industry to absorb, eventually, the labor released from the army and from war industries. He did not hesitate, however, to emphasize the fact that during the months of transition from war to peace conditions, the labor situation is fraught with disquieting possibilities if it is altogether neglected.

Road building will provide buffer employment for thousands of men until they can be absorbed by industries as the latter gradually reach their peace-stride production. Road building immediately pays dividends in increased land values. Roads are an asset to every State and to their permanent value as public improvements is now added their temporary value, of incalculable importance, of stimulating business and protecting States against the possibilities of a period of general unemployment.

If the various States would get under way such road-building projects as have been approved by the Federal Government, $56,171,846.72 would be spent for better roads and, if the construction costs are higher than in prewar times, the actual financial outlay

for the States need not be higher, since approximately half of the bill would be paid by the Federal Government.

There have been set aside to cover the Federal Government's portion of the costs on the 760 road projects approved in various States, more than $21,000,000. This now is available for States which will go to work on their road construction on plans approved by the Federal Government.

Although Federal aid for State roads has been available since 1917, but eight States report road projects, involving Federal aid, completed. Arkansas has completed one project completed two projects of 6.785 miles, Louisiana has completed one project involving 5.549 miles, California has of 4 miles, Massachusetts has completed two projects of 13.802 miles; North Carolina, one project of 8.01 miles; Vermont, one project of .793 miles; Washington, one project of 3.5 miles; and West Virginia, one project of 2.53 miles. In all, ten projects have been completed of a total mileage of less than 45 miles.

In so far as getting under way road-building projects involving Federal aid goes, Arizona, Connecticut, Delaware, Maine, New Jersey, Oklahoma, Rhode Island and Tennessee have five or less projects which now are approved by the Federal Government. Five projects in Illinois involve 178.75 miles of road and the estimated cost is $2,946,311.92.

Texas with 70 projects, leads in the number submitted and approved by the Government. These involve 992.53 miles of roads, the estimated cost being $3,968,494.43.

In estimated cost of road projects approved by the Government, Pennsylvania leads with a total of $4,792,875.65 and Ohio is second with a total estimated cost of $4,777,207.05. Pennsylvania's program calls for the building of 146.88 miles, while in Ohio 148.4 miles are involved.

The Information and Education Service, through the Division of Public Works and Construction Developments of the U. S. Department of Labor, emphasizes the fact that with more than $45,000,000 now appropriated by Congress for Federal aid in road building, less than 45 miles of roads have been completed under the Federal Aid plan. Such States as have been allotted Federal aid on approved projects, the Department submits, are in position to give general business a great stimulus and to effectively combat the ills incident to general unemployment, by immediately getting the road building work under way.

Modern Management Applied to Quarrying

(Continued from Last Issue)

It has been shown how the hauling to the crusher could be done with the quarry planned to be worked in two shifts. With the cars hauling to the crusher they could be so arranged that in dumping, they would not dump directly into the crusher, thus choking it, but instead of a flat surface where it must be rehandled by hand, shovel or fork, the loads would fall upon an incline that would feed directly into the crusher, the pieces being drawn down by a hook, one man instead of two feeding the crusher, his work being easier than when two men were used.

According to the methods outlined, and with systematic planning and the proper kind and size of quarry cars, there would be three crews loading, so that a more regular flow of broken stone would come to the crusher, assuring regular feeding and the maximum output of the crusher, which is

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BUCKET ELEVATORS, with buckets on chain or belt, furnished with or without steel casings.

BUCKETS—standard types in steel or malleable iron, steel buckets of special design made to your specifications.

GEARS—MACHINE MOLDED or with CUT TEETH.

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CHAIN—standard malleable detachable, Ley bushel, steel or malleable roller.

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not attained under the present arrangement.

With dump carts without tail gates men must raise the stone to load it 30 inches from the ground. With tail gates this distance is increased by the height of the gates. With a low type of quarry cars, dumping from a tipple, the stone does not have to be raised over half the height to load carts. This means that at least one man out of every three can be saved and yet the same output obtained. Thus with 6 men loading two carts, 4 men can load as much stone into cars. Thus 6 men loading cars will increase the day's output nearly 35 per cent. This means a great saving in labor.

With the work planned and the quarry operated in two lifts, the drilling, no matter what kind of drills are used, can be done along some well-thought-out system. Instead of picking out a place for a hole or two and putting them down and blasting, after but little experimenting, the holes as a rule could be spaced according to a prearranged plan, so as to reduce the drilling per ton of rock produced to the minimum and the amount of explosives used being such as to throw down and break up the maximum amount of rock. This blasting is most important as the cost can easily become excessive. Many blasts are economical when considered as to the quantity of rock loosened, but when the additional cost of breaking up boulders and rehandling part of the blasted material is considered, the blasts prove to be inefficient.

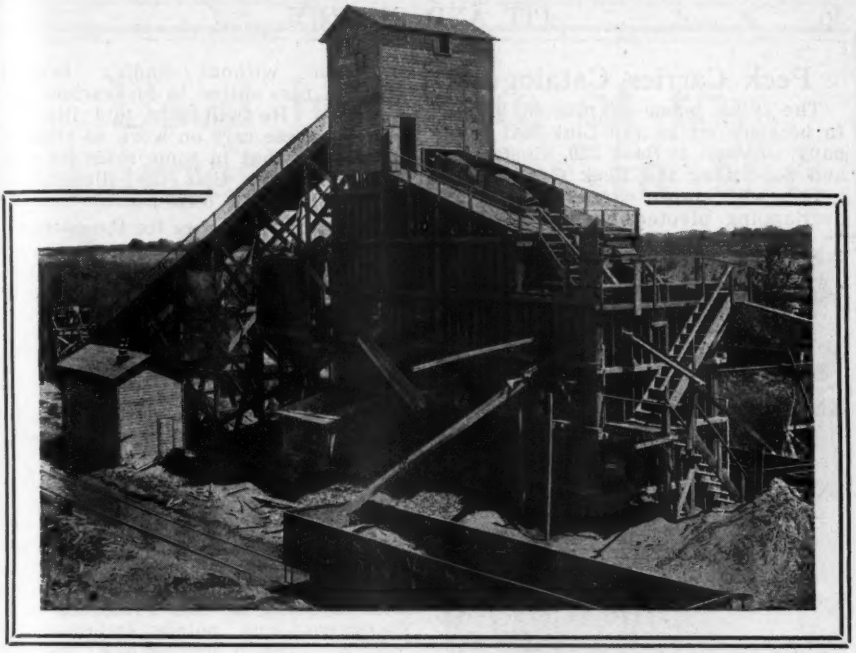
This was one trouble in this quarry, the holes were shallow and near the face of breast so that they could not be sprung. With straight dynamite shooting the majority of the rock was thrown down in boulders. To get to these meant that the fine stuff, or a large part of it, had to be handled and the drillers and sledgers did this, adding much to the cost of the quarrying. With only a small per cent of the rock being in boulders these could be broken up by sledges or drillers as the muckers came to them, so that labor is saved, and the bulk of the work is only handled once in breaking up and loading. Of course, hand drilling should not be done. This small boulder breaking should be done with a jack hammer drill. The saving of two or three men in breaking up rock would materially reduce the weekly payroll. With an increased output at less cost, not only is the tonnage cost reduced, but the plant and overhead cost is likewise lessened, and thus there is a nice extra profit made by modern management for each ton of stone produced.

Many quarry owners and operators who may read this will say to themselves, as many a man has said before, "I agree as to what is said about this quarry for I have seen these things myself, but it is different in my quarry. I use more up-to-date methods." Your quarry may be different in some respects, you may not even produce crushed stone, or any broken product, but some finely dressed dimension stone, or polished plumber's slabs or even onyx, but the underlying principles are the same, and an analysis of your quarry will show the same inherent wastes, unless the principles of modern management are understood and applied, as will be pointed out in other articles of this series.

Shay Geared Locomotive

The Shay locomotive, manufactured by the Lima Locomotive Works, Lima, Ohio, is very largely used in pits, quarries, cement plants and the like, because of the fact that, being a geared locomotive, it accelerates quickly and gets its load started very rapidly.

They also spot cars accurately and pull at a steady and even pull at all speeds.



Why Buy Experiments?

OUR engineers have designed three out of every four sand and gravel washing plants in the United States.

Not one of them was a "cut and dried" proposition. Each was designed to meet individual requirements. Whether the desired output was 10 or 300 carloads a day, local conditions formed the basis of our engineering calculations in each case.

No Link-Belt designed and equipped sand and gravel washing plant is an experiment. The success of your plant is assured the moment you avail yourself of our services in its design.

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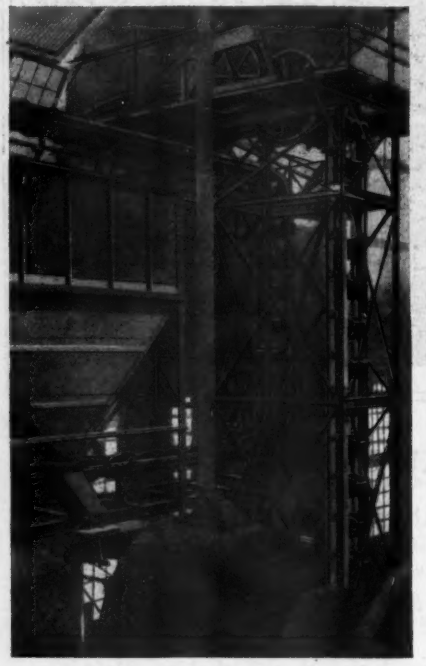
LINK-BELT

Sand and Gravel Plants

Peck Carrier Catalogue

The latest piece of printed matter to be sent out by the Link-Belt Company, Chicago, is Book 220, illustrating and describing the Peck Carrier.

This well known carrier consists of overlapping pivoted buckets for carrying coal, coke, ashes, cement, sand and other materials.



The book is fully illustrated with typical installations as well as drawings showing the details of the carrier and method of installing.

Cars to Meet Your Needs

The catalogue recently issued by the Watt Mining Car Wheel Company is, in a way, a jubilee issue commemorating the completion of fifty years of business of this company. In this time an extensive plant has been built up at Barnesville, Ohio, in which the company takes just pride and is glad to show visitors through at any time.

The company designs and builds cars for every branch of the industrial field. It will be impossible for the operator in pits, quarries and mills to look through the 156 pages of this catalogue without finding several types of cars suited to his various operations. He will also find illustrations of these cars on work so similar to his own that in some cases he will almost believe that the illustration was made at his own plant.

It will be a pleasure for the operator who is studying the matter of cars to look through this catalogue and determine upon just the type of car which is best suited to his needs.

Rates on Plaster

The Interstate Commerce Commission has condemned as unreasonable rates on plaster, carloads, from Gypsum, Utah, to destinations in California on the lines of the Santa Fe and Southern Pacific. The Commission orders that on or before July 15 the carriers establish a rate not exceeding 29.5 cents, 60,000 pounds minimum, from Gypsum to San Francisco and Sacramento and points intermediate thereto. The Commission's finding was that the rate should not have exceeded 27.5 cents prior to June 25, 1918, and 29.5 cents since then. The rates charged ranged from 32.5 to 36 cents.

Orders Filled Promptly

It is interesting to know that the Cleveland Wire Cloth & Manufacturing Co., 3573 East Seventy-eighth street, Cleveland, Ohio, carries in stock a large supply of Cleveland double crimped wire cloth in all standard sizes of mesh, so that orders can be filled on reasonably short notice. This company also manufactures special mesh cloth to suit requirements.

Takes Care of Itself

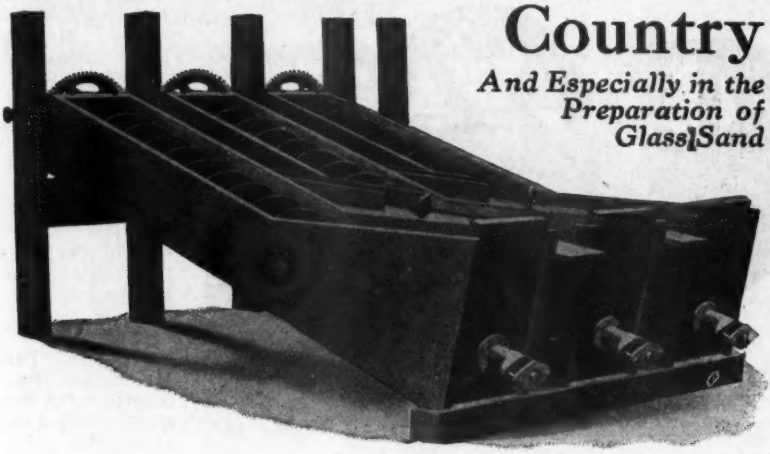
For pit and quarry use, the operator will appreciate an air compressor which practically takes care of itself.

The Curtis air compressor is such a machine, full particulars of which will be given by writing to the Curtis Neumatic Machinery Co., 1628 Kienlen avenue, St. Louis, Mo.

These compressors have been designed with special attention to this class of work. They have self-regulating splash system for cylinder oiling, and are fully enclosed so that they are dirt and dust proof.

Used in Some of the Largest Quarries in the Country

And Especially in the Preparation of Glass Sand



LEWISTOWN
Sand Washers

These are reasonably priced, well built, compact outfits, which can be easily and quickly installed. They are simple in construction and efficient in operation. Extensively used in the manufacture of glass sand which is so much needed today in the making of optical lenses for field glasses, telescopes, etc., required by the Government.

If you are not acquainted with Lewistown equipment and service, it will pay you to look into it.

We are in position to assist you solve your problem of whatever nature, if it pertains to crushing, grinding, screening, washing, drying and conveying, as we manufacture a full line of this machinery and equipment. Drop us a line stating what you desire information on.

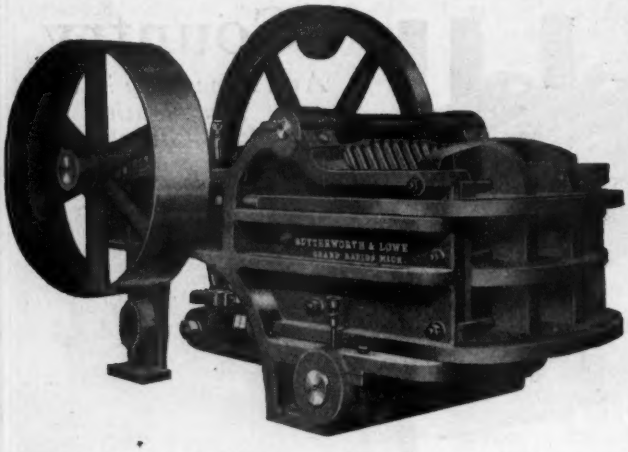
Lewistown Fdy. & Machine Co.

LEWISTOWN, PENN.

Jaw and Rotary Crushers

Butterworth & Lowe, 66 Huron avenue, Grand Rapids, Mich., are manufacturing, for a variety of uses, jaw and rotary crushers for all kinds of rocks and ores except the very hard est.

The company also designs modern



plaster mills, equipping them with all necessary machinery.

One of its specialties is a crusher-grinder for lime.

Send for Bulletin C-2

Economy of installation, operation and repair is effected by the use of the Tower Dryer for sand, gravel and cement plants.

This is installed by Earle C. Bacon, Inc., 26 Cortlandt street, New York.

This firm also sells complete crushing, screening and washing plants for sand and gravel. All of these are described in bulletin C-2, which will be sent on application.

Pulverizer Catalogue

The K-B Pulverizer Company, Inc., 70 Worth street, New York, will be glad to send to all who are interested its latest catalogue of crushing and pulverizing machinery.

The K-B pulverizer is built completely of steel and has many improved features which warrant serious consideration wherever the crushing of moderately hard materials is contemplated.

Ideal Catalogue

The Ideal Engine Company of Lansing, Mich., manufacturers of Ideal power and equipment, which includes many various types of hoists and pumping outfits for general contracting, road building and excavating work, etc., were recently fortunate in adding Mr. H. H. Lucas to their sales force. Mr. Lucas, before joining the U. S. navy, where he became an ensign, was with the Lansing company, and following his honorable discharge from the service in April he took active duties in the sales department of the Ideal company.

Mr. E. B. Beck of Mt. Bethel, Pa., has incorporated Seguire & Co., with a capital of $18,000.

Business Change

The F. Norwood Wilson Machinery Co., 321 West 35th street, Chicago, has taken over the entire line of the National Equipment Company and is now manufacturing their entire line of steel and wooden derricks, cableways, cranes, hoisting engines, hand crabs, steel and cast iron sheaves, bronze bushings, slack lime outfits. New catalogue is now ready.

Recent Patents

1,293,132. Shoveling and loading apparatus. William K. Liggett, Columbus, Ohio, assignor to The Jeffrey Mfg. Co., same place.

1,293,960. Rock drill. William A. Smith, Denver, Colo., assignor to The Denver Rock Drill Mfg. Co., same place.

1,293,961. Rock drill. William A. Smith, Denver, Colo., assignor to The Denver Rock Drill Mfg. Co., same place.

1,294,439. Swivel truck for dipper excavators. James C. French, Kenosha, Wis., assignor to Frederick C. Austin, Chicago, Ill.